THE AMERICAN
JOURNAL OF PHARMACY

MAY, 1897.

MEMOIR OF ROBERT SHOEMAKER.

Robert Shoemaker deceased on the 17th day of December, 1896, at his residence, 1736 Green Street, in this city, at the age of 80 years.

Notwithstanding the bodily infirmities which attend advanced age, he continued his attention to business until November, when serious illness obliged him to retire. He was the oldest druggist in Philadelphia who continued actively in business up to the time of his decease.

The ancestors of Robert Shoemaker came from Kriegsheim, a village on the right bank of the Rhine, about eight miles from the town of Worms. The family name was Schumacher, anglicized to Shoemaker after their arrival in America.

In 1677 William Penn visited Kriegsheim, attracted by the religious persecution of Dissenters, whose religious views were somewhat in accord with those of the Friends, or Quakers as they were then called.

Penn tendered to them an invitation to join his colony in Pennsylvania. In 1683 a part of the family emigrated, and were followed by others in the next three years. They settled near Philadelphia, in the locality known as Germantown, and their names are associated with the early history of Germantown and the adjacent districts.

Robert Shoemaker was the son of Richard M. and Sarah Shoemaker. His mother's maiden name was Sarah Clever. He was born in Shoemakertown, Montgomery County, Pa., February 2, 1817; his father conducted a country store at that place. His early education was acquired at Abington school, and at the school of Solomon Jones, in Cheltenham township.

In 1831 Robert was apprenticed to William Scattergood, a member of the Society of Friends, to learn the drug business. Many of the prominent apothecaries of this city were, at that period, members of this religious society.

The store of Wm. Scattergood was at the corner of Second and Green Streets, Philadelphia.

The aptitude and ability of the young apprentice was shown by his purchase of the store in 1837, when only twenty years of age.

In 1837 Robert commenced the preparation of the plasters of the U. S. Pharmacopœia. While engaged in the manufacture of plasters, his attention was directed by the late Prof. William Procter to the value of the residuum liquid which had been allowed to run to waste. By his request and advice he prepared for him some glycerine from this waste liquor, which was presented by Prof. Procter as the first glycerine made in this city, if not in America (1846).

Glycerine had not then come into use, medicinally or in the arts, and there was no demand for it. In 1848 the French medical journals called attention to its use in pulmonary complaints. This notice of its use created a demand among the medical profession, and in 1848 Mr. Shoemaker made the first glycerine that was sold in this market; the quantity was small and the price was $4.00 per pound. The entire product sold in 1848 was 15 pounds. As the demand increased, importation of glycerine commenced, and the price fell. In 1849 Mr. Shoemaker made about 200 pounds, the price averaging about $2.70 per pound.[1]

In 1852 his brother, Benjamin H. Shoemaker, was taken into partnership with him. A specialty of the firm was the manufacture of spread plasters, which acquired a high reputation in the trade; they were the first in this city to engage in this specialty. Adhesive plasters, spread on muslin, had been in use many years, but the apothecary had been obliged to spread all other plasters on sheepskin, as the occasion required.

During his apprenticeship Robert Shoemaker was denied the advantages of attending the instruction given by the College of Pharmacy.

The lecture course was in the evenings, generally the most busy time with the apothecary. He was obliged to make good, as far as possible, the loss of this opportunity by self-instruction, and in con-

[1] An interesting paper, by Mr. Shoemaker, on this subject will be found in the AMERICAN JOURNAL OF PHARMACY, June, 1879.

sequence was not a graduate of the College, a circumstance which he often spoke of with regret.

After entering into business on his own account, he became a member of the College, and was made a member of its Board of Trustees March 27, 1843, and first vice-president 1869, continuing in that office up to the time of his death. In 1894 the degree of Master in Pharmacy was conferred upon him by the College.

After conducting business for nearly twenty years at Second and Green Streets, the firm removed, in 1856, to Fourth and Race Streets, and greatly enlarged their business.

In 1864 two sons of Robert, Wm. M. and Richard M., were taken into partnership. In January, 1866, Benjamin H. Shoemaker withdrew from the firm, and, taking an adjoining store, gave his attention exclusively to plate and window glass, a branch of the business whith had grown to such large proportions as to make its separation from the drug business of the firm desirable. The firm now consists of Richard M., Thomas E. and Benjamin H. Shoemaker, Jr.

His experience in business convinced Robert Shoemaker of the advantage to be derived from a meeting of those engaged in the wholesale drug and manufacturing business, and on January 22, 1861, he signed the call for such a meeting, which eventuated in the founding of the Drug Exchange of Philadelphia.

He was president of this body from 1867 to 1870, and in 1890 was made an honorary member, in recognition of his valuable services.

He was one of the incorporators of the Consolidation Bank, and one of its directors from the time of its founding.

For many years he was a member of the Fire Insurance Association of Philadelphia, and of the Delaware Mutual Fire Insurance Company.

After the failure of Jay Cooke, in 1873, he was appointed one of the trustees for the settlement of their affairs.

He took great interest in public school education, was a director in the Cheltenham District, Montgomery County, for over fifteen years, giving active service in every detail pertaining to the welfare of the scholars and teachers, the school at Shoemakertown being named after him.

Robert Shoemaker was married to Elizabeth Moore, daughter of the Rev. William Moore, of Philadelphia, November 25, 1837.

She died February 26, 1857, leaving the following children: William M., Richard M., Sarah C., Joseph M., Thomas E. and Benjamin H. Shoemaker, Jr.

He was again married to Ann Summers, of Alexandria, Va., to whom were born the following children: James, Roberta, Mary and Ellis C. Shoemaker, and who survive him.

Robert Shoemaker was a representative man in the drug trade of Philadelphia; conservative, yet progressive, he conducted business for sixty years with skill and good judgment, and with a conscientious regard to its close connection with the public welfare.

The sharp competition in trade in his latter years did not disturb his broad views of honorable business methods.

The benefit of his long experience and good judgment was often sought for by younger men, and the kindly manner in which he received such applicants gained for him their confidence and respect.

As a member of the Episcopal Church, he took an active interest in the congregation of St. Paul's Church, Chelten Hills, near which he resided for many years. For a long time he was accounting warden of the church, and continued as such up to the time of his death. In the ground adjoining this church his mortal remains were consigned to rest.

A life extending to four score years may not be marked by great events; but measured by the quiet and steady pursuit of duties well performed, and with a just regard of the interests of his fellow-men, and continuing to the end of his sojourn here, erects a monument to his memory in the esteem and affection of all who knew him.

C. B.

GELSEMIC ACID.

By Virgil Coblentz.

The following notes are intended to serve as a preliminary notice concerning investigations on the above subject, which have been carried on at intervals for some years.

The subject was taken up at the suggestion of Professor Lloyd, who also kindly supplied the author with about 50 grammes of an unusually fine crystalline sample of undoubted purity.

This principle was first isolated by Professor Maisch in 1869, named and fully described by Professor Wormley in 1870. Professor Wormley, in his investigation, simply restricted himself to applying various

color tests for the purpose of identifying the principle from the standpoint of a toxicologist.

Dr. Chas. Robbins, in his work on "Ueber die wesentlichen Bestandtheile von Gelsemium sempervirens" (1876), published analyses and claimed that this so-called gelsemic acid of Wormley was not a distinctive new principle, but simply æsculin. This assumption was later contradicted by Wormley (AM. JOUR. PHAR., 1872).

At present, attention will be directed to Dr. Robbins' analyses of this substance, but two having been made, the results being as follows:

(I)	C = 52·04 per cent.	H = 5·189 per cent.
(II)	C = 51·82 "	H = 4·98 "

Dr. Robbins carried on his combustions in a simple bayonet tube with copper oxide, as was customary at that time. This being the case, the author questions the value of the analyses and formula deducted therefrom, even though the figures correspond within a reasonably close limit.

Gelsemic acid is one of those few organic substances which, upon heating with copper oxide or any oxidizing agent, gives up only a portion of its carbon as carbonic oxide, the rest separating as a graphitic-like deposit on the sides of the combustion-tube, which cannot be removed even at the highest possible temperature. Some twenty combustions of gelsemic acid were made after various methods; in several instances two of these corresponded closely, but subsequent results did not justify that any reliance should be placed upon them. The various methods employed were: first, combustion with copper oxide in a bayonet tube; second, with copper oxide in an open tube with a current of oxygen; in the third method of combustion, lead chromate was employed; the fourth method attempted consisted in mixing the gelsemic acid with powdered fused potassium bichromate in a platinum boat, and then burning in an open tube with copper oxide in a current of oxygen.

In each of the above cases every possible device was attempted to avoid the separation of carbon in the tube, but without success. Finally, the well-known method of wet combustion with a mixture of chromic anhydride and sulphuric acid was attempted, a number

of analyses being made with no better success than before. A description of this latter method with apparatus is given here, since it has answered admirably in the analyses of various derivatives of gelsemic acid.

In the combination flask (*Fig. 1*) from 10 to 20 grammes of chromic anhydride are introduced, followed by the gelsemic acid which has been accurately weighed off in a small thin glass tube, this is placed in a nearly upright position in the flask, in order to avoid contact with the CrO_3 before the proper time. After securing all the joints of the apparatus, a slow current of pure oxygen gas is passed through the entire apparatus until practically all of the air has been removed, after which the current is regulated to about 20

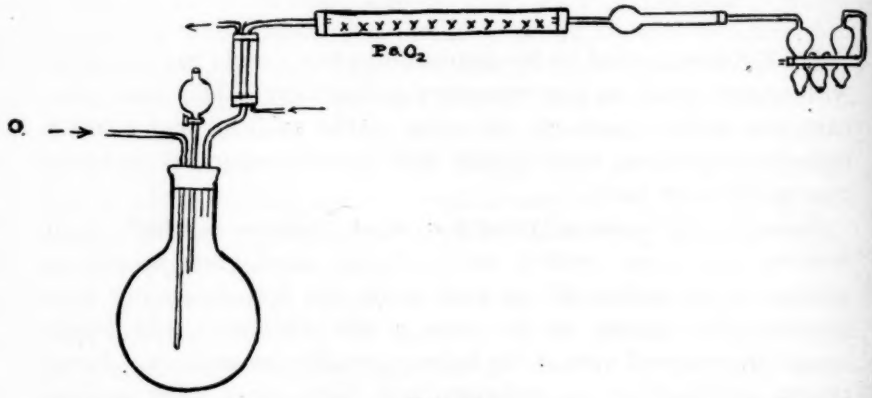


FIG. 1.

bubbles a minute, which is continued throughout the entire combustion, unless the reaction becomes violent, when the current should be temporarily closed. By slightly shaking the flask the gelsemic acid is caused to spill out, and is distributed through the chromic oxide, then the concentrated sulphuric acid which is contained in the separation funnel is allowed to trickle over the mixture very slowly, regulating the flow according to the energy of the reaction. Finally, when the reaction is over, sufficient acid is added to make a bulk of about 20 to 30 c.c. The flask and contents are then cautiously heated, increasing gradually till just short of boiling temperature, which is kept up for a period of fifteen to twenty minutes. The gases given off pass up through a well-cooled condenser into a tube which is filled with spun glass, well covered with lead peroxide,

which serves to retain any sulphur dioxide which is carried over with the mixed oxygen and carbonic oxide. After passing this tube, and before the latter is absorbed by the potash bulb, the gases are dried by passing through two calcium chloride tubes. It is scarcely necessary to note that in carrying out an analysis by this method, the greatest of care must be exercised in regulating the current to as slow a degree as possible. The analysis of acetyl and bromo derivatives of gelsemic acid by this method gave very close concordant results, whereas, as already mentioned, no reliable data could be obtained from the mother substance, owing to the fact that a small portion of the carbon escapes combustion.

The complete analyses of the acetyl and brom gelsemic acid are not given here, as the author desires to complete some molecular weight determinations before assigning a definite formula. In this connection attention is called to the differences in the melting-points of gelsemic acid, and some of its derivations, and the same of æsculin:

Melting-point of gelsemic acid is between	206 and 205·5° C.
" " æsculin is	160° C.
" " acetyl gels. acid is	180° C.
" " " æsculin is	130° C.
" " bromo gels. acid is	250° C.
" " " æsculin is	193–195° C.

Gelsemic acid readily neutralizes solutions of sodium and potassium hydrate, but fails to yield any definite crystalline salts. Various attempts were made to prepare salts with barium and magnesium with no success.

Attention is here directed to a peculiarity of the potassium gelsemium mixture, which, upon heating or igniting, becomes very voluminous, exhibiting the same phenomena as the "Pharoah's Serpent," which results on heating the sulphocyanate of mercury.

From the various data obtained in the course of my investigations, I hope, at a near future date, to be able to shed some light upon the constitution of this interesting substance, as well as to prove my surmise that gelsemic acid is a principle distinct from æsculin.

NEW YORK, April 20, 1897.

CONSIDERATION OF SOME RECENT SUGGESTIONS CONCERNING OINTMENT OF MERCURIC NITRATE.

By Charles H. La Wall.

The *Pharmaceutical Journal*, of February 27, 1897, page 172, contained an article by P. W. Squire, upon the processes now official for the preparation of ointment of mercuric nitrate, commonly called citrine ointment.

Mr. Squire's experiments were mainly devoted to the consideration of the differences now existing between the quantities and manipulations directed by the U.S.P. and B.P.

While he slightly favored the use of a combination of lard and olive oil (as is authorized in the B.P.) instead of lard oil (directed by the U.S.P.), Mr. Squire acknowledged the superiority of our process in previously acting on the fatty base with a portion of the nitric acid, instead of adding the mercury dissolved in the whole quantity of nitric acid, as the B.P. directs. His observations on the varia tions produced by the influence of different temperatures show the necessity of guarding against over-heating the compound after the addition of the mercuric nitrate solution.

In commenting upon Mr. Squire's paper in the last number of The American Journal of Pharmacy (Vol 69, p. 209), Mr. J. W. England suggests some improvements on the present officinal process, which are offered for trial and discussion.

Mr. England's improvements consist in (1) using a proportionate amount of red oxide of mercury in place of the metal; (2) changing the temperature to which the mixture should be permitted to cool before adding the mercuric nitrate solution; (3) incorporating about 5 per cent. of glycerin with the finished product when nearly cold.

The reasons given for the substitution of red mercuric oxide for metallic mercury are: (1) because small quantities of the oxide are more easily weighed; and (2) because the oxide is *probably* purer than the commercial mercury.

There are altogether six official preparations in which metallic mercury is directed by the U.S.P., so that a certain amount of dexterity ought to be acquired in the weighing of this elusive substance by a pharmacist who does his own manufacturing. As to

the relative purity of the two substances, the experience of a large manufacturing establishment shows that the commercial metallic mercury is of far greater uniformity and purity than the "red oxide" of commerce. Many samples of the red mercuric oxide have been encountered, which yielded a brownish colored nitric acid solution and left an insoluble residue resembling brick-dust; so that it would be better to use the metallic mercury in the preparation of the official solution of mercuric nitrate, in order to ensure a satisfactory product. The purity of commercial mercury was, in all cases noticed, very good; 'in purifying 156 pounds only ¾ pound of impurity was obtained, or less than ½ per cent. The use of the red oxide of mercury was suggested first in 1862[1], and more recently in 1886, by R. Rother, who "finds advantages in the use of mercuric oxide" without explaining what these advantages are.

The suggestion as regards temperature is one of great importance, as experience has shown in the manufacture of a total of hundreds of pounds by the process outlined in the AMERICAN JOURNAL OF PHARMACY, 1894, p. 523, that careful observance and control of temperature is essential for the production of a satisfactory product. The directions might be supplemented by advising the maintenance of the temperature at 60° C. until all reaction ceases, in order to obviate the development of the spongy condition so often noticed in this product.

The addition of glycerin may be advantageous in some respects, but in the formula as proposed by Mr. England, the addition of 50 grammes of glycerin to 1,000 grammes of ointment of officinal strength, reduces the percentage of mercuric nitrate below that required by the U.S.P.; this, however, could be easily remedied by diminishing the quantity of lard oil by 50 grammes.

It is well for those who have difficulty with officinal processes to suggest improvements for the same; but in the case of citrine ointment, it is extremely likely that those who fail to produce a satisfactory preparation by the U.S.P. process would not succeed with any method.

A final consideration, not to be altogether ignored, is the raising of the cost of manufacture of the preparation, which would happen

[1] AM. JOUR. PHAR., 34, p. 394.

were the oxide of mercury used in place of the metal. Calculations show that the finished product would cost about one and one-sixth times as much as it does by the present process.

305 CHERRY STREET, PHILADELPHIA, PA.

GELSEMIUM.

ANALYSIS OF ROOT, RHIZOME AND STEM.

BY L. E. SAYRE.

In the January issue of this journal, attention was called to the fact that in the commercial drug gelsemium, which should consist of rhizome and root, were frequently found portions of the stem in varying proportions. It was stated on the authority of Gerald McCarthy, botanist of the North Carolina Agricultural Experiment Station, that the stem was apparently collected and used to adulterate the drug.

It was further stated that the stem probably had no medicinal value, but of this no definite statement could be made until an analysis, then in progress, was completed. Mr. W. V. Ingham, a pharmacy student of the University of Kansas, has made this analysis, and also made a comparison of the active constituents in the three parts of the plant mentioned.

Since the time above referred to, gelsemium root has been obtained from different quarters, with a view of ascertaining the quality of the market's supply. As a result, it is safe to state that there is no difficulty in obtaining a drug free from stem from houses having an established reputation as dealers in crude drugs. The article supplied from several quarters was remarkably free from fragments of stem.

For analytical purposes a supply of the stem was obtained, not only from the commercial drug, but from a living plant of six years' growth, cultivated in a nursery.

Mr. Ingham, in order to perfect himself in the work, made a number of trial analyses of reliable powders of gelsemium, and thoroughly studied the process of isolation and quantitative determination of the active constituents.

The report of his analysis is briefly stated as follows:

Constituents.	Ingredient Percentage in Rhizome.	Ingredient Percentage in Root.	Ingredient Percentage in Stem.
Moisture	3·2	3·	3·8
Volatile oil	0·5	0·4	Trace.
Fixed oil	5·6	7·4	3·2
Resins	4·4	2·4	3·8
Gums	0·8	0·7	1·1
Gelsemine alkaloid	0·2	0·17	—
Gelsemic acid	0·37	0·3	—
Starch	6·8	7·6	6·3
Ash	2 6	2·2	2·7
Other organic acids	2·7	2·8	1·9
	27·17	26·97	22·8
Inert material, cellulose, etc.	72 83	73·03	77·2
Total	100·	100·	100·

Dragendorff's method was followed except in the case of the gelsemine and gelsemic acid, where a modified method was used. (See p. 332, Blyth, "Poisons; Effects and Detection," 1884.)

The gelsemic acid was obtained in transparent needle-shaped crystals. The alkaloid was obtained only in the amorphous state, and in that state estimated.

It would seem from the above analysis that the principles upon which the drug depends for its activity are absent or present only in small quantities in the stem, so that the admixture of any appreciable amount of stem must correspondingly reduce the value of the drug as a medicine.

THE STRUCTURE OF LEPTANDRA.

By A. P. Breithaupt, Ph.G.

Contribution from the Botanical Laboratory of the Philadelphia College of Pharmacy.

The official Leptandra consists of the rhizome and roots of Veronica virginica, Linne, belonging to the natural order Scrophulariaceæ, growing throughout the United States east of the Mississippi, being found in mountainous meadows in the South and rich woods in the North.

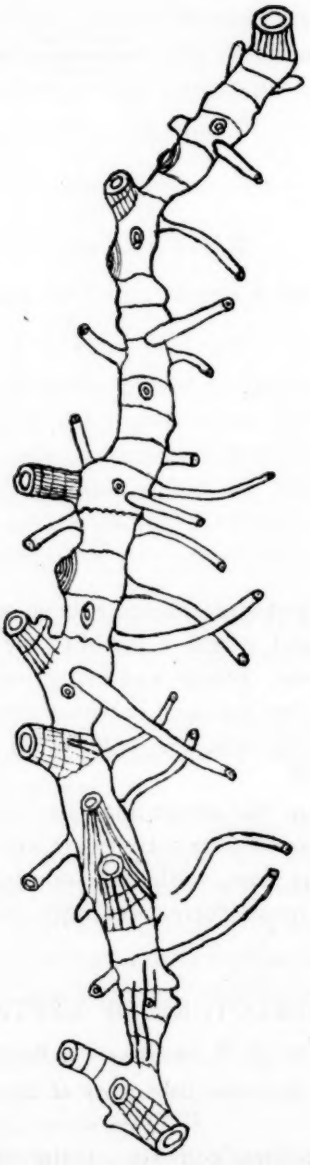


Fig. 1. Rhizome and roots of Veronica virginica, L., natural size.

The plant is an herbaceous perennial, having a simple, erect stem, from 2 to 6 feet high, bearing leaves in whorls, and terminated by a long-panicled spike of whitish flowers.

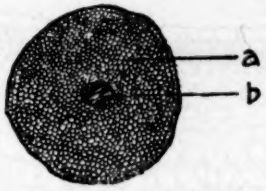


Fig. 2. Cross-section of the root, magnified 10 diameters; *a*, cortex; *b*, central cylinder.

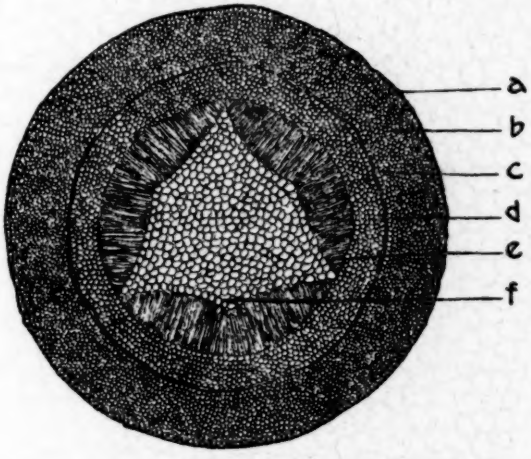


Fig. 3. Cross-section (*a*) of rhizome, magnified 10 diameters; *a*, outer layer of bark; *b*, middle layer of bark; *c*, interrupted circle of sclerenchyma fibres; *d*, inner layer of bark; *e*, wood; *f*, pith.

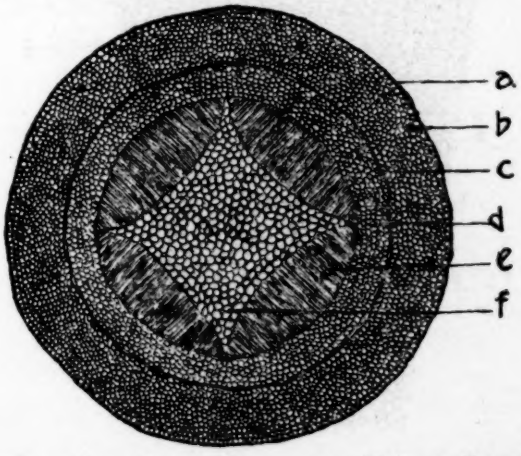


Fig. 4. Cross-section (*b*) of rhizome, magnified 10 diameters; *a*, outer layer of bark; *b*, middle layer of bark; *c*, interrupted circle of sclerenchyma fibres; *d*, inner layer of bark; *e*, wood; *f*, pith.

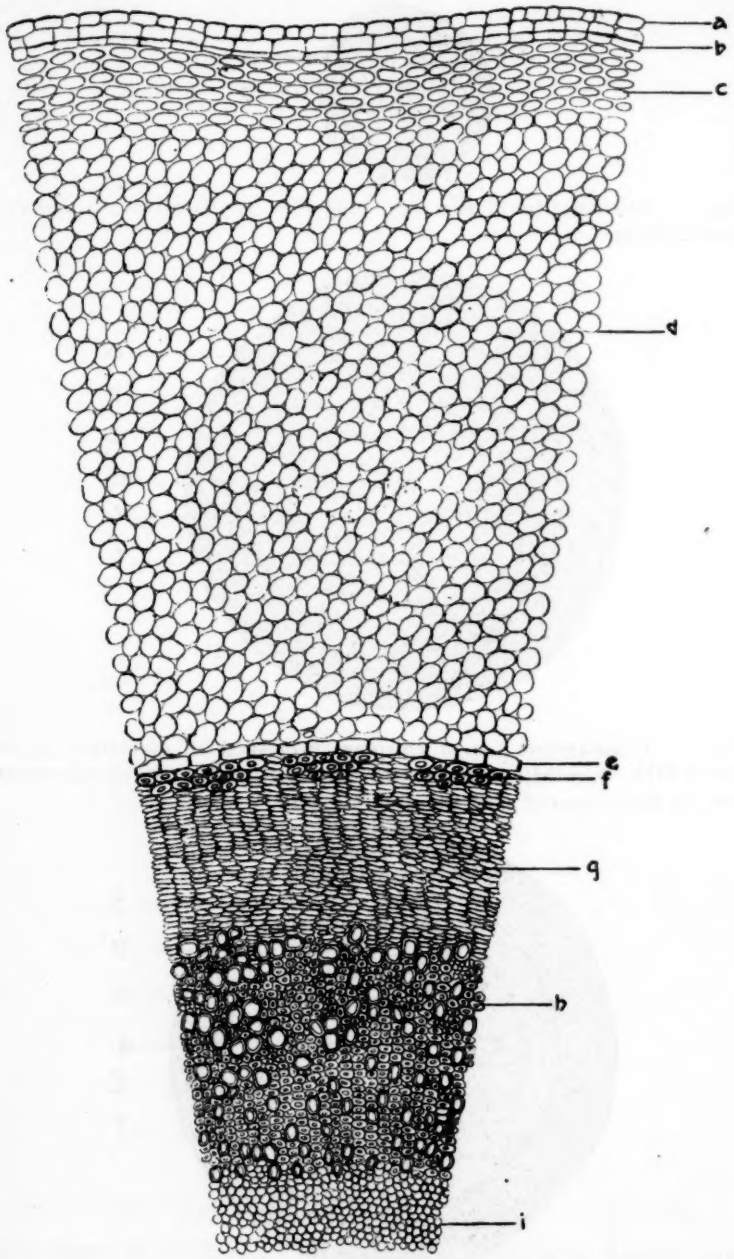


Fig. 5. Cross-section of rhizome, magnified 500 diameters; *a*, epidermis; *b*, cork or periderm; *c*, hypoderma of collenchyma; *d*, cortical parenchyma; *e*, endodermis; *f*, sclerenchymatous pericycle; *g*, phlœm or bast; *h*, xylem or wood; *i*, parenchyma of pith.

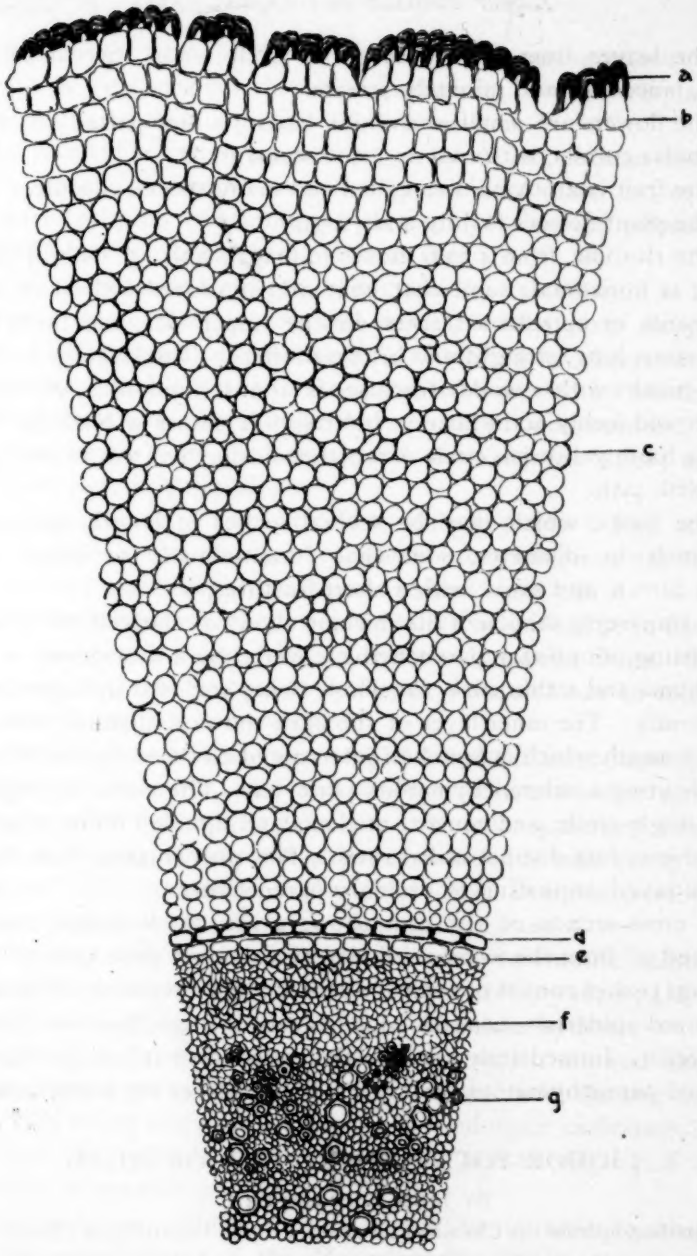


Fig. 6. Cross-section of the root, magnified 500 diameters; *a*, epiblema or epidermis of the root; *b*, exodermis or hypoderma of the root; *c*, cortical parenchyma; *d*, endodermis; *e*, parenchymatous pericycle; *f*, phlœm of the vasal bundles; *g*, xylem of the vasal bundles.

The leaves, from four to seven in each whorl, are short-petioled, lanceolate and minutely serrate.

The flowers are small and white, having a four-parted calyx and a tubular corolla, with two exserted stamens.

The fruit is an ovate, two-celled and many-seeded capsule.

The plant flowers in July and August.

The rhizome, from 4 to 6 inches in length and ¼ inch in thickness, is horizontal, somewhat bent and branched with short stem remnants or cup-shaped scars on the upper side, and beset with numerous long, straight and brittle rootlets. The rhizome is hard and breaks with a woody fracture, is almost inodorous, and has a bitter and feebly acrid taste. Internally it shows a blackish bark, and a hard, yellowish circle of wood enclosing a three- to six-rayed purplish pith.

The roots, which may be several inches in length, are about ½ inch in diameter, somewhat longitudinally wrinkled, purplish-brown, and break with a short fracture.

A transverse section of the rhizome shows a relatively thick bark, consisting of ordinary parenchyma, covered by a hypoderma of collenchyma and a thin cork, the whole being enclosed by a persistent epidermis. The inner layer of the bark shows a distinct endodermis, beneath which is found an interrupted circle of lignified fibres, constituting a sclerenchymatous pericycle. The wood is disposed in a single circle, and consists of ducts and lignified fibres arranged in more or less distinct radial rows. The pith is large, from three- to six-rayed, consisting of ordinary parenchyma.

A cross-section of the root shows a very thick cortex, sharply marked off from the woody cylinder by a distinct endodermis. The cortical tissues consist of ordinary parenchyma covered by a strongly cutinized epidermis, beneath which is seen a single layer of exodermal cells. Immediately beneath the endodermis is found a single-layered parenchymatous pericycle which encloses the wood bundles.

LIQUOR POTASSÆ AND LIQUOR SODÆ.

By John P. Bates, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 164.

According to the United States Pharmacopœia, liquor potassæ is "an aqueous solution of potassium hydrate [KOH=55·99], contain-

ing about 5 per cent. of the hydrate." The same authority describes it as "a clear, colorless liquid, odorless; having a very acrid and caustic taste, and a strongly alkaline reaction."

"To neutralize 28 grammes of solution of potassa should require about 25 c.c. of normal sulphuric acid (each c.c. of the volumetric solution indicating 0·2 per cent. of absolute potassium hydrate), phenolphthalein being used as indicator."

The Pharmacopœia also says: "Solution of potassa should be kept in bottles made of green glass, and provided with glass stoppers, coated with paraffin or petrolatum." Desiring to ascertain the strength and purity of the preparation, as dispensed by wholesale and retail drug firms, six samples were procured and examined, two being purchased from the former and four from the latter; all of the houses were in Philadelphia.

Samples 2, 3 and 5 were colorless, while 1, 4 and 6 had straw colors. Sample 4 was translucent; all the other samples were clear. All contained insoluble foreign matter except sample 2.

All of the samples were odorless and decidedly alkaline to litmus paper. All gave a violet color to the non-luminous flame. Two pharmacists took the precaution to dispense the solution in colored glass bottles, and labelled poison.

The writer also examined the samples for potassium, by acidifying the solution with acetic acid and adding sodium cobaltic nitrite. All of the solutions showed this base. Number 3 showed a small amount of calcium, when some of it was acidulated with acetic acid and mixed with ammonium oxalate; the other samples were free from it. Carbonate was found in samples 1, 2, 3 and 5.

By titrating with decinormal sulphuric acid volumetric solution, the samples were found to contain, respectively, 3·18, 8·74, 4·10, 3·74, ·018 and 4·38 per cent. of absolute potassium hydrate.

Attention is directed to sample No. 5, which showed about ·018 per cent. of potassium hydrate as calculated from the acid used. But in view of the fact that the sample showed much carbonate, it is likely that the solution owed its alkalinity almost entirely, if not altogether, to potassium carbonate.

Liquor sodæ, or solution of soda, should be, in order to comply with the requirements of the United States Pharmacopœia "an aqueous solution of sodium hydrate (NaOH = 39·96), containing about 5 per cent. of the hydrate." The Pharmacopœia also desig-

nates it as "a clear, colorless liquid, odorless, having a very acrid and caustic taste, and a strongly alkaline reaction." "To neutralize 20 grammes of solution of soda should require about 25 c.c. of normal sulphuric acid (each c.c. of the volumetric solution indicating 0·2 per cent. of absolute sodium hydrate), phenolphthalein being used as indicator."

The Pharmacopœia recommends the solution to be dispensed in the manner ordered for liquor potassæ. In order to determine the exact quality of the article as sold by manufacturing pharmacists, six samples were purchased and examined. Four of these were obtained at retail stores and two at wholesale houses. When the samples were subjected to the flame test for sodium, samples 1, 3 and 6 gave evidence of potassium. These behaviors were afterwards confirmed by means of the sodium cobaltic nitrite test. Sample 3 was translucent, the other samples were clear. Samples 1, 3 and 4 had straw or yellow colors; the others were colorless. Sample 3 was the only one containing insoluble foreign matter. All were odorless and strongly alkaline to litmus paper. No. 3 contained calcium. Carbonate was present in samples 1, 2, 3 and 5. Three pharmacists dispensed the samples in colored vials. Two of these vials bore poison labels.

Upon titrating the samples with decinormal sulphuric acid volu metric solution, they were found to range from one-half to twice the official strength, as follows:

10·00, 4·47, 2·31, 5·25, 4·21 and 4·93 per cent.

VALUATION OF LIQUOR IODI COMPOSITUS.

By Richard Hal Compton, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 165.

Lugol's solution is required by the United States Pharmacopœia to be a 5 per cent. solution of iodine, dissolved in water by the addition of 10 per cent. of potassium iodide. The same authority directs that if "12·66 grammes of the solution be mixed with a few drops of starch test solution, it should require for complete decoloration from 49·3 c.c. to 50 c.c. of sodium hyposulphite decinormal volumetric solution (each cubic centimeter of the volumetric solution corresponding to 0·1 per cent. of iodine)."

Being desirous of knowing to what degree the retail dispensers were governed by the Pharmacopœial requirements for liquor iodi compositus, I obtained a few samples at different pharmacies and estimated the per cent. of iodine by the official method. The results of my titrations indicated the following percentages for the samples: 4·96, 4·82, 4·72 and 4·17.

As there is no test given under Lugol's solution for estimating the potassium iodide present, I have made some experiments for the purpose of devising one. The following was found to be the best of several methods tried, and can be recommended on the concordant results which it furnished:

Take a definite amount (12·66 grammes) of the solution and titrate it according to the official method of estimating the iodine. The amount of the latter is thus obtained. Now titrate the residual liquid with decinormal silver nitrate volumetric solution, using potassium chromate as an indicator if desired, until all of the iodides which the solution contains have reacted with the silver nitrate and formed insoluble silver iodide.

The iodides of the solution consist of the potassium iodide originally present and the sodium iodide produced in the reaction between the sodium thiosulphate and the free iodine of the sample. The volume of the solution of sodium hyposulphite is the measure of the free iodine of the sample, and therefore the equivalent of the volume of silver nitrate required to react with the sodium iodide which it forms. Hence, if the volume of sodium hyposulphite required to decolorize the iodine of the sample be deducted from the volume of silver nitrate required to completely precipitate the decolorized liquid, the remainder will be the volume of decinormal silver nitrate volumetric solution required for the potassium iodide that was present. Multiply the number of cubic centimeters so found by 0·016556, the value of 1 c.c. of the silver nitrate solution in potassium iodide, to find the amount of potassium iodide. Then by proportion calculate the percentage amount of it.

It was also found that practical results could be gotten by boiling the Lugol's solution after dilution with water until all the free iodine was expelled, and then titrating with standard silver nitrate solution, which indicated at once the amount of potassium iodide present.

THE PRESENCE OF STARCH AND STRONTIUM SULPHATE IN OPIUM AND THEIR INFLUENCE ON ASSAYING.

By LYMAN F. KEBLER and CHARLES H. LAWALL.

Although poppy juice does not contain any starchy matter, yet the presence of this article in opium has been reported in a number of instances. According to the Pharmacographia, p. 47, Egyptian opium sometimes contains an abundance of starch. Mr. Mjöen,[1] who has probably made the most exhaustive microscopic study of opium on record, reports that Persian opium is abundantly contaminated with wheat and leguminous starch. More recently Mr. Jelliffe,[2] in a report at the regular meeting of the New York College of Pharmacy, stated that from 5 to 10 per cent. of starch was found in the samples examined.

We ourselves have found wheat starch in opium assayed during the past two years. Mr. Moerk kindly sent us six samples of opium from three to five or six years old and every one contained wheat starch. The amount varied from a trace to 8 per cent., but it was always present. Why the starch is there and how it came to be there we can only surmise. In some cases it may have been added for gain, but from the small quantity present in some samples its presence may be accidental. Persian opium is exported to Constantinople, by way of Trebizond, and is there worked up into forms to imitate the Asia Minor opium. Here is probably the source of contamination with starch, since Persian opium contains much of this.

Before leaving the question of starch, a few words about its estimation in this connection may not be out of place. There are two ways of arriving at approximate results—microscopically and chemically. The one is probably as accurate as the other.

Microscopically, dry the opium, note moisture and reduce to a fine powder. Weigh out 1 gramme of the powder, introduce it into a mortar containing 2 c.c. of alcohol; with a pestle rub up the opium well, add 8 c.c. of simple syrup and mix intimately. Of this mixture prepare a slide and by means of an ocular micrometer, divided into square millimeters, count the number of granules in a

[1] 1895, *Arch. d. Pharm.*, 233, 533.
[2] 1897, *Am. Drug.*, 30, 41.

square of 100 square millimeters. Should any worker be without a micrometer, the total number of granules in a field may be counted. Repeat the counting with successive drops three or four times, and take the average of the several countings. Having approximated the number of starch granules in the above mixture, prepare a syrupy mixture of the same starch as that contained in the opium, say a 1 per cent. mixture, and determine the number of starch granules as above. If the number of starch granules is greater or less than those contained in the opium mixture, dilute the mixture or make a more concentrated one, as the case in hand requires. If the number of granules is the same in both mixtures, the per cent. of adulterant is readily calculated.

When more than one kind of starch is present, the per cent. of adulterant is more difficult to determine.

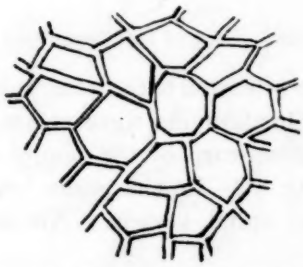


Fig. 1. Epidermis of capsule, magnified 500 diameters.

Chemically, the starch can be estimated as follows: Exhaust 10 grammes of the opium with cold water, place the residue into a flask, add 200 c.c. of alcohol containing 5 per cent. of potassium hydroxide, and boil vigorously on the water bath for about fifteen minutes. Filter while hot and wash the residue with hot alcohol, until the filtrate is nearly colorless. Dissipate the alcohol from the residue and introduce the latter into a suitable flask, add 200 c.c. of water, 16 c.c. of hydrochloric acid (specific gravity 1·16), attach to a reflux condenser and boil gently for three hours. Cool the contents of the flask, neutralize with sodium carbonate, filter and make up to a definite volume. In this estimate the reducing sugar by Fehling's solution, either volumetrically or gravimetrically. The weight of reducing sugar multiplied by 0·9 equals the amount of starch contained in 10 grammes of opium.

By this process there is estimated as starch, the pentosans and other carbohydrate bodies, which will undergo hydrolysis when boiled with hydrochloric acid. We have reasons for thinking that starch estimations made in plant analysis by means of hydrochloric acid are frequently wide from the truth.

Fig. 2. Epidermal tissue of leaf, magnified 500 diameters.

Let us now turn our attention to the general microscopical appearance of the opium. On clarifying some opium with chloral hydrate the structure of the pericarp of the poppy was clearly brought out, as shown in *Fig. 1*. In the same clarified material were found scalariform and spiral vessels. An abundance of calcium

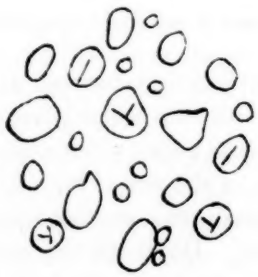


Fig. 3. Wheat starch granules, magnified 500 diameters.

oxalate crystals and some wheat brand were found in several cases. Leafy epidermal tissue was also abundant on every slide, *Fig. 2*. The starch was brought out by the usual iodine reaction, *Fig. 3*.

All these substances that do not increase the yield of morphine, by our present methods of assay, must, in our opinion, be considered

of minor importance, so long as it is only required of opium to contain a certain amount of morphine. Substances that do increase the yield of morphine are the ones that annoy the analyst.

About a year ago[1] one of us (K.) called attention to the fact that the amount of impurity associated with the crystallized morphine, as obtained by the U.S.P. process, was abnormally great. The situation has not changed for the better, at this writing. During the past few months some of the opium assayed, yielded unusually high results. The perplexing part in some cases was the fact that one duplicate contained a much larger amount of impurity associated with the morphine than that of the other duplicate. The amount of impurity was estimated by the ash method. This, of course, indicated that some inorganic substance or substances were influenc-

Fig. 4. Crystals from alcohol-ether precipitate, magnified 500 diameters.

ing the results. The ash was repeatedly examined, and in every case strontium was indicated.

It has frequently been observed, and commented on,[2] that when the 10 grammes of alcohol are added to the 20 grammes of opium extractive, a turbidity frequently results. We now extracted 40 grammes of opium, preparatory to making a 40-gramme, instead of the usual 10-gramme, assay. The customary proportions of alcohol and ether were added and the assay allowed to stand over night. In the morning, it was found that 1·6 per cent. of material had precipitated out. On igniting this precipitate, 19·3 per cent. was volatilized. The residue consisted of strontium, *Fig. 4*, calcium and

[1] 1896, AM. J. PHARM., **68**, 257.
[2] 1895, *J. Soc. Chem. Ind.*, **14**, 464.

potassium sulphates. Since no effervescing was produced when the ash was treated with acid, there was probably no calcium meconate present in the original precipitate.

Several experiments were now undertaken to ascertain the cause of the variation of the amount of impurity contained in the crystallized morphine. One case was sampled twice, by two persons, each using different lumps. These samples were assayed in the usual manner with the following results; average of duplicates:

	Morphine, Crude.	Morphine, Pure.	Moisture.	Crude Morphine in Dry Opium.	Pure Morphine in Dry Opium.
Sample 1 . . .	11·48	10·68	22·68	14·86	13·81
Sample 2 . . .	10·83	10·43	19·52	13·48	12·97

The variation in the crude morphine is chiefly due to the impurity present, as is clearly shown from the fairly uniform results obtained for the pure morphine.

These same samples were now assayed by both of us, varying the conditions of precipitation, such as temperature, time of shaking, etc., with results as follows:

		Crude Morphine.	Pure Morphine.	Moisture.	Crude Morphine in Dry Opium.
Sample 1 . .	L.	11·48	10·68	22·68	14·86
	L.	11·56	10·81	22·68	14·96
	K.	10·94	10 58	22·68	14·16
Sample 2 . .	K.	10·96	10·58	19·52	13·63
	K.	10·90	10·35	19·52	13·54
	L.	10·84	10·43	19·52	13·48

The above results are average of duplicates. They show that ordinary variations in assaying influence the results very little, when referred to pure morphine. The greatest variations appear to be due to the sampling, and to the impurity associated with the morphine as obtained by the U.S.P., method of assay. The impurity contained in the crude morphine was estimated by the ash method. This method probably gives higher results than any other, and is perhaps the best, considering the present impurities in opium.

In order to ascertain whether or no we had unconsciously lapsed into a trend, Dr. Squibb's chemist, Mr. Smith, kindly checked our work, and with his permission we append his results below in connection with our own. Mr. Smith employed Dr. Squibb's process as outlined in the Ephemeris, **3**, p. 1152, and the U.S.P. method with the lime water correction. We used the U.S.P. process and

applied a correction by means of the ash method. The results are given below:

	Crude Morphine.		Pure Morphine.
Smith	17·27	Squibb's process	16·13
	16·78	U.S.P. process	16·19
LaWall	17·11		16·09
	17·04		16·03

Ten cases of opium from one consignment were assayed under most favorable conditions, in reference to temperature, amount of washings and time of shaking out the morphine. The first five cases were assayed one day, and the remaining five, two days later. The results were as follows:—

No.	Crude Morphine.	Pure Morphine.	Moisture.	Crude Morphine in Dry Opium.
1.	12·34		20·52	15·53
2.	12·38		20·35	15·55
3.	12·39	11·36	20·81	15.65
4.	12·33		20·04	15·35
5.	12·34		19·58	15·34
6.	12·65		20·32	15·88
7.	12·78		19·55	15·89
8.	12·74	11·64	19·51	15·83
9.	12·79		19·17	15·82
10.	12·48		20·79	15·75

A glance at the above figures shows a uniformity in the quality of opium hitherto unnoticed in assaying large consignments. The additional circumstances of the presence of wheat starch in the opium, and strontium in the ash, would indicate a previous manipulation of a large quantity of opium, before packing it into cases for shipment.

The perplexing part of this view lies in the fact that the yield of morphine is still several per cent. higher than the limit required by the custom house; since it would be just as easy to reduce the morphine to 10 per cent., thus making an additional profit and still be above the legal standard.

The question naturally arises, can starch or epidermal tissue, or rumex seed, or strontium sulphate, or the calcareous salts found in Turkey opium be classed as adulterants of opium in the true sense of the word? We all know that the opium as it comes into the market is the concrete juice of the poppy, mixed with various and sundry substances, and to say that this or that is an adulterant of

opium, would require an explicit and comprehensive description of what is, and what is not, an adulterant. For an analyst to condemn a case of opium, on the ground that it contained starch, when the only requirement is a certain amount of morphine, would lay himself open to criticism. We, however, do think that a substance like strontium sulphate, which increases the apparent yield of morphine, ought to be looked on as an adulterant of a fraudulent nature.

305 CHERRY STREET, PHILADELPHIA.

ON THE PRESERVATIVES OF PHARMACOPŒIAL PREPARATIONS.[1]

BY WILLIAM MARTINDALE.

In the work of compiling formulæ for the use of medical practitioners and pharmacists, care is necessary to test the keeping properties of the various solutions and preparations, and having prepared and kept a number of these preparations, I thought a few notes on them might prove interesting. They are purely pharmaceutical, and must not be considered as having bacteriological importance.

The vehicle mostly used for the internal administration of medicines, of course, is water in some form or other, but distilled water alone is recognized by the Pharmacopœia, and probably this, as frequently met with, is more defective from a standard of purity than most preparations in the Pharmacopœia. It is even more prone to develop minute organisms than many of the spring waters that are to be met with, although these may contain inorganic salts, which render them unsuitable as solvents and vehicles in which to administer medicinal preparations. So much has distilled water obtained this evil reputation that a bacteriologist of eminence is reported to have said that one of the best incubating fluids was a certain manufacturer's distilled water.

Various means have, therefore, been adopted for sterilizing it and rendering it aseptic for pharmaceutical use, such as keeping it in a cool place, and, of course, free from dust, and having it recently well boiled and cooled. The best and only method to be depended upon, however, care having been taken to select a good water for distillation, as well as to refuse the first and last products, and to ensure

---

[1] *Pharmaceutical Journal*, March, 13, 1897.

freedom from contamination afterwards, is to have it freshly distilled; in fact as regards the whole of the preparations of the Pharmacopœia, they should be as freshly prepared as possible, and the use of preservatives should be avoided unless absolutely necessary, but from a practical point of view we cannot do without them. For example, the public demand for pills is now that they must be well preserved and look nice, although they may be insoluble.

Alcohol.—The most common preservative used officially is alcohol in one form or another; it is true that it is not used solely as a preservative, but as a solvent; it enters more or less into the composition of nearly all our tinctures, liquid extracts, wines, and many of our official solutions. The germination of most of the micro-organisms occurring in aqueous solutions of vegetable and animal substances is inhibited by the presence of 20 per cent. by volume of absolute alcohol, but it is inhibitory only, and in this proportion or upwards; it is in no way germicidal, as on evaporation the anæsthetized germs, if I may so term them, readily take up life and propagate. This applies to most of the volatile antiseptics, in fact, for organic tissues, such as strong mineral acids, alkalies and halogens. Exceptions to this are carbolic acid, creosote, and weak solutions of corrosive sublimate, which act probably by coagulating the albuminous substance of the microbe. Wines I have mentioned; unless fortified, from their very origin, that of fermentation, they are too weak to prove of useful service in pharmacy, and in fact medical wines are anachronisms.

Glycerin.—The abuse of alcohol has led those who take extreme views on this subject to endeavor to use other solvents and preservatives for pharmaceutical preparations. Among these, avoiding ethylic alcohol, whose physiological properties are too well known, they have selected glycerin, which is but another alcohol whose action physiologically is not so well ascertained, nor is it so inhibitory to the development of micro-organisms. Its strong solvent action on vegetable extractives, its non-volatility, and its stability in other respects would have rendered glycerin a useful pharmacopœial solvent, but although it has been tried again and again and was made official, more especially in preparing some of the liquid extracts of the United States Pharmacopœia, it has not met with general acceptance. It nevertheless has a curious preservative action over some inorganic compounds in preventing oxidation.

For example, black mercurial lotion can be preserved in its normal black color by the addition of 5 per cent. by volume of glycerin, but I find that 10 per cent. of mucilage of tragacanth will produce the same result, and have the advantage, from its viscosity, of holding mercurous oxide well suspended; the addition of both these to the preparation would be an advantage. It has further been suggested that glycerin should be used to preserve sublimate solution, especially the official liquor hydrargyri perchloridi, as it has been thought necessary that this solution requires preserving, from the chemical, not, of course, from the biological point of view. But both glycerin and alcohol added to this solution, especially if exposed to light, cause a reduction of the salt and deposition of mercurous chloride, as in the official solution of the Codex, which contains 10 per cent. of alcohol. Notwithstanding statements to the contrary, I find that a simple solution of mercuric chloride in distilled water, or even in spring waters containing supercarbonate of lime in solution, is more stable than it is with a preservative added, especially one of such a nature as chloride of ammonium in the official solution. This, as I showed so long ago as 1870,[1] instead of being a preservative, forms a double salt in solution (sal alembroth *plus* an excess of chloride of ammonium), and the solution, if prepared with common water in place of distilled water, or even if prepared with distilled water and diluted, throws down a quantity of one of the white precipitates of mercury. To such an extent is this the case that I found in preparing a pint of the official solution with new river water in place of distilled water, that 2.7 grains of this precipitete was deposited, thus about one-fourth of the mercurial salt was rendered insoluble in preparing the solution, and more deposited on further dilution with the water. In fact, a time arrived when there was scarcely a trace of mercury salt in solution, and as this preparation is most largely used in hospitals where common water is always used to dilute the medicines, it leads to very discrepant results therapeutically. It has also been suggested that chloride of sodium should replace chloride of ammonium in the official solution, as this salt is largely used in making the sublimate tablets for the convenience of surgeon's use, but I have found that although sodium chloride helps these tablets to disintegrate readily it has no advantage, in fact it is detrimental to the keeping properties of the solution. I have here

[1] *Pharmaceutical Journal*, [2] Vol. XI. p. 544.

two specimens prepared in November, 1895, with water from the Brighton constant supply, which is a very calcareous water; one is a simple solution of the perchloride, and the other has an equal weight of pure chloride of sodium added. The latter you will observe has deposited much more than the former, in which there is hardly a trace of deposit. This strongly illustrates the undesirability of tampering with solutions in order to make them, as we consider, more stable; in fact, with few exceptions no preservative should be added to a pharmacopœia preparation unless the label indicates boldly that it is there. While on the subject of mercuric salts, I should like to illustrate the importance of having our lime water of full strength, and well preserved.

In making the yellow mercurial lotion of the B.P., which has 18 grains of sublimate to 10 ounces of lime water; if the lime water be only three-fourths, or from keeping, so low as one-half the pharmacopœial strength, a brick-red preparation, an oxychloride is produced, rather than the yellow mercuric oxide.

Acetic Acid.—Of other preservatives, which are also solvents used officially, acetic acid of varying strengths is employed, as in acetum cantharidis and acetum scillæ. This, as I notice Prof. Remington recently points out,[1] was much employed in the pharmacy of the ancients, sometimes combined with honey to form oxymels, of which we have inherited both the vinegar and the oxymel of squill. Acetic acid has the disadvantage, however, unless in a very concentrated form, of growing micro-organisms abundantly, and the fungi and animalculæ developed in brown vinegar must be well known to all of you. Acetic acid, therefore, besides being incompatible with alkalies, is not a good preservative, although in some cases it may be a useful solvent.

Sugar.—Of the preservatives used officially which are not solvents, this is employed most extensively, not only with us, but in France and in the United States; in fact, so much is this the case in France, that Mr. Ince once remarked in this room that French pharmacy might be summed up in one word, "sugar." On account of its palatability it of course meets with favor, especially among children. It enters into the composition of all the syrups and lozenges, and most of the confections and powders, and is a useful preservative from oxidation of the ferrous preparations, such as the

[1] *American Journal of Pharmacy*, March, 1897, p. 121.

saccharated carbonate of iron, mixture of iron, Blaud's pill, and iodide of iron pill. It also preserves lime in solution, as in the well-known liquor calcis saccharatus, of a strength about sixteen times that of the official lime water; if a pure marble lime be used, I find as much as 1·77 per cent. is dissolved, or 8·16 grains in a fluid ounce. This preparation is more conveniently made by using an equivalent weight of syrup, *i.e.*, three ounces in place of two of sugar, and adding it to nineteen ounces of distilled water containing the lime in suspension. The "caking" which is apt to occur is thus avoided.

Salicylic Acid.—The well-known uses antiseptically of this for surgical purposes, although prohibited from being used for preserving wines in France, have rendered it servicable in preserving the official solution of hydrochlorate of cocaine, which contains 1½ per mille of the acid, with 10 per cent. of the cocaine salt. I find that this solution, even if diluted with four times its volume of water, still keeps free from fungoid growths. The use of this acid might be objected to in the solution, because salicylic acid forms with cocaine an indefinite compound rather than a salt, the so-called salicylate of cocaine; but it appears not to throw the hydrochloric acid out of combination, and has proved very serviceable in preserving the solution of this cocaine salt, which has a great tendency to develop fungoid growths. The salicylic compound appears to be allied to the benzoic compound, benzoyl-ecgonine. It forms a pasty mass which has not, that I am aware of, been studied. If any defence were needed for using a preservative, perhaps this official solution of cocaine is a typical case. The use of this solution of salicylic acid, 1½ per mille, which is nearly saturated, as a vehicle, might be extended to other solutions, for example, the official solution of sulphate of atropine, but I have not found this solution, if made with a well-crystallized salt, prone to grow fungi. Its use, however, cannot be extended to the hypodermic injection of morphine; if a solution of tartrate of morphine, 1 in 12, or even 1 in 20, be prepared in it, a crystallized salicylate of morphine separates; 16½ tartrate keeps well alone.

Of the salts of morphine suitable for hypodermic injection, the tartrate seems to be now favored; the acetate solution, prepared by dissolving pure morphine in just enough acetic acid, has till lately been mostly used, but it has the objection of possessing a

tendency to decomposition and becoming muddy and dark-colored. Still I have two solutions here over 18 years old, no extra sterilizing precautions were taken when made; they are well preserved and are perfectly transparent, although they have slightly changed color. One is of the strength of 1 grain in 6 minims, which I advocated in a paper in 1870,[1] the other is 1 grain in 12 minims. A small dose is generally preferred for hypodermic injection, but the strength of 1 grain in 6 minims is considered now to be dangerously strong in the hands of an unskilled operator. The more nearly saturated, however, the aqueous solution of any salt or crystalline principle is, the better it will keep; in fact, it was a curious argument of an advocate for spontaneous generation that there was a debatable land between that of crystallization and the germination of organisms in these solutions—that is, between the growth of crystals and of organisms; this applies widely in pharmacy, as we well know, in keeping syrups for example. A nearly perfect syrup consists of two parts of sugar and one of distilled water; kept at a uniform temperate heat, this neither crystallizes nor grows fungi; and our solid medicinal extracts are preserved if they contain no excess of moisture.

Further, these remarks especially apply to the official solutions of acetate and citrate of ammonium, which are much better kept in a concentrated form.

The salicylic acid solution cannot either be used for preparing the hypodermic injection of apomorphine; a 1 per cent. solution of the hydrochlorate of apomorphine prepared in it gives a quantity of a crystalline deposit.

Hydrochlorate of apomorphine in aqueous solution rapidly develops a green color; this has been attributed to the influence of ammonia in the atmosphere, but although a drop of solution of ammonia does develop the green color immediately, it is apparently not due to this alone. This salt is now prepared much purer than formerly, and it is also not so soluble. The official strength of the hypodermic injection, 1 grain in 50 minims, *i.e.*, 1 in 45.5 parts, of camphor water is not held in solution at 60° F. Dott gives the solubility in water as 1 in 50.89, Squire as 1 in 56 to 60. I find 1 part in 60 of boiled and cooled distilled water dissolves, but turns green within a few hours, but if acidulated with a trace of hydrochloric acid, say an equal weight of the official diluted hydro-

[1] *Pharmaceutical Journal*, [2] Vol. XI, p. 480.

chloric acid, the color is preserved, but it is rendered less soluble. More than 1 per cent. solution, if acidulated, is not certain to keep free from crystals at the variable temperatures to which it may be exposed, and less than the quantity of acid I have named does not keep it free from color.

Sulphurous Acid.—A trace of sulphurous acid, say one-quarter per cent., added to a 2 per cent. solution of the apomorphine salt, keeps the solution for a moderate time, but not indefinitely, and the use of such a deoxidizing agent is not desirable, as its action on the apomorphine salt is not clearly understood. Nevertheless, sulphurous acid is largely used as a preservative of such preparation as orange wine.

Boric Acid.—Of the preservatives suggested for keeping apomorphine injection, boric acid has been mentioned, but this I find, in a solution containing 2 per cent. of each, boric acid and hydrochlorate of apomorphine, forms an opaque white jelly, and even with 1 per cent. of each, a curious translucent jelly is formed, quite unsuitable for hypodermic injection. Boric acid has been recommended and is used largely for preserving solutions for hypodermic injection, but as a solution of it, 1 in 30 parts of water, which is nearly saturated, will itself develop some peculiar fungi, I can see little advantage in employing such a preservative pharmaceutically. Mr. Lee has mounted a specimen of a *torula* which has been grown in a saturated solution of boric acid in distilled water.

Camphor Water.—The same remarks apply to camphor water, the favorite of Raspail, as to boric acid. It is a weak inhibitor, and it further has the disadvantage of the camphor being volatile. Camphor water is official as the solvent of atropine in the solution of sulphate of atropine, but oculists complain of the irritating action of camphor in the eye.

Chloroform.—The addition of chloroform to vegetable infusions and other aqueous preparations of vegetable and animal substances was recommended by Mr. J. B. Barnes[1] in the proportion of from one-eighth to one-half per cent. by volume. The addition of chloroform as an inhibitory in suspended pharmaceutical operations is of great service, and it has the advantage that by gently warming the solution for a short time it can be easily dissipated, but it has also the disadvantage that the chloroform evaporates too easily for pro-

[1] *Pharmaceutical Journal*, [3], Vol. V., p. 441.

longed preservation, yet I have tried the experiment of preserving fruit (damsons) in stoppered bottles, adding about one three-hundredth part of their weight of chloroform to them. The preservation was complete, but the flavor of the chloroform was not dissipated by even baking the fruit in pies.

Hydrate of Chloral has been used as possessing similar properties to chloroform, being more readily soluble and less volatile, but its taste is nauseous.

Carbolic Acid.—The odor and flavor of this most powerful antiseptic is against its use for internal administration, excepting for hypodermic injections; it is the best preservative for ergotin in aqueous solution. Boric acid in this solution fails; Mr. Severn kindly infected for me three solutions of ergotin with *Penicillium glaucum*; No. 1, without preservative added, developed in forty-eight hours; No. 2, with 1 per cent. of phenol added, is undeveloped yet, after five days; No. 3, with 2 per cent. of boric acid, developed on the side of the bottle, just above the surface of the liquid, in seventy-two hours. Creosote also, although one of the best preservatives, as its name indicates, is not admissable, on account of its odor.

Cherry Laurel Water.—This is recommended in France for preserving hypodermic injections. So, also, are the distilled waters of meadow sweet and eucalyptus. I am not aware that

Formaldehyde has been much used pharmaceutically, although it has, I understand, been used for milk preserving for some time. Its peculiar action on gelatin in rendering it insoluble would tend to prove that it was not desirable for internal administration, as it might seriously interfere with digestion.

Hypophosphorus Acid.—This and *citric acid* are employed commercially to prevent the change of color of the ferrous syrups; as traces only are needed, it may be considered a venial offense. But preservatives are sometimes used, or are added even officially, which are often disadvantageous. For example we have two arsenical solutions official, one acid and the other alkaline. A simple solution of arsenic anhydride in water of the same strength, colored if desired, is perfectly stable. It would be compatible with both acids and alkalies, and might take the place of both the official solutions.

Carbonic Acid.—This in solution in water is inhibitory to organic growths, and is largely used in preparing carbonated waters and "Fluid Magnesia," but otherwise it is not of much service.

Benzoic Acid.—For preserving lard and some official ointments, the melted fats are macerated with powdered benzoin, by which means they obtain an agreeable odor and become impregnated with benzoic acid. Both these tend to preserve the fats from becoming rancid. But in using these fats for preparing the ointments of the alkaloids, apparently some change takes place; they become discolored, and in the case of cocaine we know, as I have before mentioned, a comparatively inert compound of benzoyl-ecgonine, etc., is formed, so that the use of benzoated lard is to be avoided for preparing these ointments.

Paraffin Basis.—Where quick absorption is not required, the preservative action of the soft paraffins renders them all that can be desired, as also is oil of theobroma for suppositories.

Aromatic Waters and Essential Oils.—The oils of clove, cinnamon, peppermint, and many others are preservatives; so are their aqueous solutions, but I can only mention them.

Heat and Cold.—A gentle heat assists the incubation of nearly all micro-organisms; a greater heat, that of boiling water for example, is a sterilizer; whereas a still higher temperature is a disorganizer, and is destructive to all organic growths. Cold, on the contrary, the freezing point of water and below, as a rule, is only inhibitory to the development of the lower organisms, their vitality is but suspended, and they spring into life again with the first application of a gentle warmth. It may appear irrelevant to my subject, but the important bearing preservatives have on our food supplies, including frozen meat, makes them of great importance commercially. In fact, in viewing the pharmaceutical aspect of preservatives, I have but touched the fringe of the subject of their utility. Without the aid of boric acid and other preservative, many of our articles of daily food would be at famine prices. In such a condensed population as that of London, it would now be almost impossible to supply the necessary quantities of butter, milk and fish in a fresh condition. We have long been dependent to a great extent on the importation of flour and corn. The same has now become the case in regard to our animal food products.

THE PRODUCTION OF CAMPHOR IN CHINA.[1]

By Augustine Henry.

The camphor tree, Cinnamomum camphora, Nees et eberm, is indigenous to Japan, Formosa and the central and southern provinces of China. It has been known to the Chinese from ancient times, but apparently until 300 or 400 years ago only as a valuable timber tree.

The camphor first in use was undoubtedly the Malay camphor, and as Hanbury says ("Pharmacographia," p. 511), "at what period and at whose instigation the Chinese began to manufacture camphor from the camphor laurel is not known." Hanbury further states that "The camphor of European commerce is produced in Formosa and in Japan, and we have no evidence that any is now manufactured in China, although very large trees, often from 8 to 9 feet in diameter, are common; for instance, in Kiangsi, a camphor wood is an important timber in the Hankow market." The latest references to camphor production ("Index Floræ Sinensis" II., p. 371) further would confirm this, viz., "Kwangtung, common around Pakhoi, but not utilized" (Playfair). Again, "Dr. Henry states that the wood is much used in Central China, but no camphor is extracted."

Until a few years ago, then, no camphor was produced on the mainland of China, but it is interesting to note that the camphor industry has been started in China, and that there are signs that it will become important. This is all the more noteworthy, as Formosa has become Japanese territory, and it seemed likely that camphor would become an entirely Japanese article, not a desirable contingency in view of the fact that the Japanese Government is striving to establish a monopoly in the production of camphor in Formosa, and has no doubt in contemplation the creation of a large revenue by enhanced prices in the future.

For a history of the vicissitudes of the camphor trade in Formosa itself the reader is referred to the "Chinese I. M. Custom, Decennial Reports" for 1882–91, pp. 439, 466. *En passant*, this is a most valuable work for all questions connected with Chinese commerce, the history of the treaty ports, etc. It is replete with information of all kinds, and is illustrated with maps, plans, and diagrams.

---

[1] *Pharmaceutical Journal*, March 6, 1897.

GROWTH OF THE CHINESE CAMPHOR INDUSTRY.

The growth of the camphor industry on the mainland of China is shown by the following facts taken from various China Customs' Yellow-books. From the "List of Chinese Medicines," miscellaneous series, No. 17, which gives details of the trade in drugs of all kinds for the year 1885, it appears that camphor was unknown as a product of the mainland, except in the single province of Chekiang, there being the small export that year from Ningpo of 25 piculs. Ningpo exported 32 piculs in 1889, 40 piculs in 1890, and none since, apparently. The Customs' "Trade Reports," for the different years show the gradual appearance of camphor production in other parts. Kowloon exported 88 piculs in 1888, 106 piculs in 1892, 87 piculs in 1893. This was conveyed in junks, and its *provenance* is doubtful, but it was perhaps from the province of Kwangsi. Canton exported 122 piculs in 1893, 37 piculs in 1894, and 237 piculs in 1895. This is Kwangsi camphor. The Pakhoi Trade Report for 1894 states that the first record of the article was in 1892; in 1893 the export was 23 piculs, which increased to 128 piculs in 1894, and "it comes from Lu-chuan, near Yü-linchow, and is likely to grow in importance, as plantations in that and other places in the neighborhood are coming to the bearing age." In the Pakhoi Trade Report for 1895, the export is given as 596 piculs, and the writer says that this gratifying increase is due to the extended cultivation in Kwangsi. In Formosa, only old and enormous camphor trees are utilized, and I am inclined to doubt the existence of camphor plantations in Kwangsi; the camphor produced is more likely to be from old forest trees. The Chinese, at any rate, did not plant any trees with a view to the manufacture of camphor.

EXPORT OF CAMPHOR FROM CHINA.

In 1895 the exports of camphor from different Chinese ports was: Foochow, 187 piculs; Amoy, 668 piculs; Canton, 237 piculs; Kowloon, 68 piculs, and Pakhoi, 596 piculs. In the Fukien province there are large forests and camphor trees abound. Some years ago, a party of Japanese went into the interior of Fukien to manufacture camphor, but nothing came of this attempt. The Foochow export is probably the product of this province, but that of Amoy is doubtful, as it may be Formosan camphor smuggled over to the mainland in junks. The export of the other three ports is produced in the

Kwangsi province, and this will probably grow into large figures, if camphor continues high enough in price to encourage the Chinese in its manufacture.

To sum up, the production of camphor on the mainland of China is an affair of the last few years. It began in Chekiang, but has practically ceased in that province. In Kwangsi it commenced a short time ago, and promises to develop into importance. The Fukein product is only trifling so far.

EDITORIAL.

EDSON SEWELL BASTIN.

On the morning of April 6, 1897, Edson S. Bastin passed away, after an illness of several months. His funeral took place at Merchantville, on the 9th, and was largely attended by members of the College and students.

The Board of Trustees was in session when the sad news reached them, and a series of resolutions were directed to be drawn up for approval at a subsequent meeting. Two days later a special meeting of the College was held, and appropriate resolutions were directed to be drawn up to express the sentiments of that body.

It is merely desired to record the foregoing facts at the present time; a memorial will be prepared and published in a subsequent number of this JOURNAL. It is but justice to say, at this time, that while Professor Bastin's occupation of the Chair of Botany and Materia Medica in this College was short in duration, it was long when measured by results accomplished. More than that, he won the respect, confidence and admiration of every one with whom he came in contact during the short four years he was with us.

THE AMERICAN MEDICAL ASSOCIATION.

The fiftieth annual meeting of the Association will be held this year in Philadelphia, during the first week in June. As the Association originated in this city fifty years ago, more than ordinary efforts will be made to have a notable meeting. Elaborate preparations have already been made by the Committee of Arrangements for the extraordinary attendance which is anticipated. The section on Materia Medica and Therapeutics has been invited to hold its sessions at the Philadelphia College of Pharmacy.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

DES ACANTHACÉES MÉDICINALES. Par Georges Dethan. Deuxieme Édition. Paris: A. Malone, 1897. Pp. 192.

Two months ago we briefly reviewed the first edition of this work, which was issued as a thesis which had been presented to the École Supérieure de Pharmacie de Paris. The present edition has been revised, corrected and enlarged.

OBSERVATIONS ET EXPÉRIENCES SUR L'OUVERTURE DES FLEURS DE L'ŒNOTHERA LAMARKIANA, SER. Par M. Louis Planchon. Reprint from the *Bulletin* de la Société botanique de France, November, 1896. This is a close study of the process of opening of the flowers of œnothera, and it throws much light on the subject in general.

VIOLA TRICOLOR, L., IN MORPHILOGISCHER, ANATOMISCHER UND BIOLOGISCHER BEZIEHUNG. Von Henry Kraemer. Universitäts-Buchdurckere's von Jh. Aug. Koch, Marburg, Germany, 1897.

Professor Kraemer has carefully worked out the life history of this interesting plant, and at the same time has added to the value of the work by an elaborate series of illustrations. The results are presented in twelve sections, the last being a short account of what is known at the present time of the chemistry of the plant. As pointed out by earlier investigations, salicylic acid is the most interesting compound; it exists partly as a methyl salicylate, and partly in combination with various inorganic salts. A valuable bibliographical index completes the work.

ON THE CONSTITUENTS OF THE SAP OF THE "SILKY OAK," GREVILLEA ROBUSTA, R. BR., AND THE PRESENCE OF BUTYRIC ACID THEREIN. By Henry G. Smith, F.C.S. Read before the Royal Society of New South Wales, October 7, 1896. In a previous communication on the timber of this tree, the author, in conjunction with J. H. Maiden, has pointed out the presence of a deposit of aluminum succinate. Now, having demonstrated the presence of butyric acid in the sap, he is led to believe that the succinic acid is derived from butyric acid by natural oxidation in the tree.

THE DYEING PROPERTIES OF AROMADENDRIN AND OF THE TANNINS OF EUCALYPTUS KINOS. By Henry G. Smith, F.C.S. Reprint from the *Journal of the Society of Chemical Industry*, November 30, 1896.

UEBER FLECHTENSTOFFE. Von Dr. O. Hesse. Reprint from *Berichte d. deut. chem. Gesellschaft*, 30, 357.

EXAMINATION QUESTIONS OF THE PHILADELPHIA COLLEGE OF PHARMACY, 1896-97.

FIRST YEAR EXAMINATION.

PHARMACY.

A—Crystallization. (1) Describe the method of obtaining crystals by deposition from supersaturated solution. (2) Define pellicle. (3) Water of crystallization. (4) Interstitial water. (5) Efflorescence. (6) Deliquescence. (7) Mother liquor. (8) What is intermediate crystallization?

B—Syrups. (1) Define syrups. (2) Name five methods for official syrups. (3) What kind of sugar is best adapted for making syrups, and give the reasons for preferring this kind of sugar. (4) Describe a method of preserving fruit juices in bottles, and state the causes which lead to the decomposition of solutions containing organic matter, if not protected.

CHEMISTRY.

C—Halogen Group. (1) Enumerate the elements belonging to the Halogen group, and briefly describe the physical appearance of each of them. (2) Give the formulas of their hydrogen compounds, and state which of them are official compounds. (3) Write a chemical reaction for the production of one of these elements and a chemical reaction for the production of one of the hydrogen compounds above mentioned.

D—Phosphorus. (1) Describe the element phosphorus in its several forms

(2) From what sources do we obtain it, and what are its practical uses? (3) Give the chemical formula for hydrogen phosphide, and state how it is obtained.

BOTANY.

E—(1) In what group of plants are the sporophyte and gametophyte generations nearly equal in development? (2) In flowering plants, what two kinds of spores are produced, and in what organs are they borne respectively? (3) In most of the higher plants, into what organs are root and shoot differentiated? (4) Define the terms sporophyll and hypsophyll, and give examples of each as they occur in the flowering plant. (5) What are the microsporangia and macrosporangia commonly called, respectively, in the flowering-plant? (6) What peculiarities in the leaf venation and in the numerical plan of the flowers enable us, usually, to distinguish a monocotyl from a dicotyl? (7) Name examples of each of the following kinds of fruits: a syconium, a drupe, a legume, a pepo, and an akene.

F—Materia Medica. (8) Describe Uva-ursi as to the following points: length, shape, surfaces, venation, margin, texture, taste, a medicinal constituent, and the chief use of the drug. (9) Name two official leaves which possess internal glands. (10) State the important structural differences between German and Roman chamomile.

COMMITTEE.

G—Glycerin. (1) Name three principal reasons showing its value in pharmacy. (2) What official class of preparations contains glycerin as a base? (3) What is glycerin, and what is its principal use?

H—Chemical Terms. Write concise *definitions* of each of the following chemical terms: (1) matter; (2) elements; (3) atoms; (4) atomic weight; (5) equivalence or valence; (6) molecules; (7) molecular weight; (8) equation; (9) chemical reaction; (10) acids.

I—Problem. A laboratory formula called for 8·5 kilos of 50 per cent. orthophosphoric acid. How much of the U.S.P. phosphoric acid (85 per cent.) would be required to take its place in the formula? Show the figures used to obtain your result.

K—The Flower. (1) Define the term sporophyll. (2) State what two kinds of sporophylls occur in the flowers of most of the higher plants. (3) State what they are commonly called, respectively, and what is the function of each. (4) State, also, what other modified leaves the flower may possess.

OPERATIVE PHARMACY.

(*1*) *Specific Gravity.*

Determine the specific gravity of the liquid contained in the four-ounce bottle; put all calculations on the sheet of paper, with your name and examination number.

(*2*) *Percolation.*

Percolate 100 grammes of gentian, with 500 c.c. of water. Label the percolator with your name and examination number.

(*3*) *Granulated Salt.*

Acid Salicylic	7 gm.
Sodium Carbonate C. P.	6·5 gm.
Distilled Water q. s.	

Make Sodium Salicylate. Put in the wide-mouth bottle.

PHARMACOGNOSY.

In this branch each student was given specimens of ten official vegetable drugs, and was required to give the official name and common names, if any, and also describe the chief characteristics of each specimen.

SECOND YEAR EXAMINATION.

PHARMACY.

A—(1) What is the official name for Solution of Hydrogen Dioxide? (2) What is the synonym? (3) What is the official description? (4) Give a brief outline of the process for preparing it. (5) What are its uses?

B—(1) What is the official name for Solution of Ferric Chloride? (2) What is the official description? (3) Give a brief outline of the process for preparing it. (4) If the finished solution has a blackish tint, what is it due to? (5) How may this be removed?

C—(1) What is the official name for Ether? (2) What is its specific gravity? (3) How is it made on the large scale? (4) What are its physical properties and uses? (5) Is Ether vapor heavier or lighter than air?

D—(1) Explain the natural changes which occur in the pulpy constituents of unripe fruits during ripening. (2) Have fleshy roots any of the constituents of unripe fruits? If so, name them. (3) Explain the reasons for adding ammonia-water to preparations of glycyrrhiza and senega. (4) How do acids and heat affect the constituents of fleshy roots?

E—What are the essential points of difference between a volatile oil and a fixed oil? By what test may one be distinguished from the other? What is oleic acid? How is it prepared? What are its uses in pharmacy and medicine? Describe the manufacture of Soap? What is Sapo Mollis? How is it prepared? What is Castile Soap chemically? And what useful by-product results from the manufacture of Soap?

CHEMISTRY.

F—(1) Give the reactions for the production of Sodium Carbonate by the Leblanc process? (2) Give the reactions for the production by the Ammonia-Soda and Cryolite processes? (3) State what are the by-products in each of these processes and which of them are of value.

G—(1) Describe the metal Copper and state from what ores it is obtained. (2) Describe *Cupri Sulphas* U.S.P. What is the change of appearance effected in it by prolonged heating? What is the result of the addition of aqua ammonia to copper sulphate solution? (3) Mention the more important alloys of copper, stating the several components of each.

H—(1) How is the metal Aluminum obtained? (2) Give the chemical formula of *Alumen* U.S.P. (3) Describe silicate of aluminum and state its uses.

I—(1) Describe the more important tests for the detection of Arsenic. (2) How would you distinguish Arsenic from Antimony in these tests? (3) Describe *Acidum Arsenosum* U.S.P.; give its chemical formula and its common name.

K—(1) Enumerate the several varieties of glass and state their approximate chemical composition. (2) What is "soluble glass?" (3) Mention some of the materials used in coloring glass?

MATERIA MEDICA AND BOTANY.

L—Tissues. (1) Enumerate the different kinds of tissues found in plants. (2) Define meristem and state how its cells differ from ordinary parenchyma

cells. (3) In what parts of an ordinary tree, such as the elm, for example, does meristem occur? (4) State how the wall of an ordinary parenchyma cell, that of an ordinary epidermal cell, and that of an ordinary wood fibre differ from each other in their chemical and physical properties.

M—The Structure of Stems, Roots and Leaves. (5) In what respect does the growing tip of a Fern stem differ from that of a Dicotyl stem? (6) What three layers are recognizable at the growing tip of a Dicotyl stem, and into what regions do these layers develop, respectively, as the stem matures? (7) What kind or kinds of vasal bundles are characteristic in each of the following organs: the root of Sarsaparilla, the trunk of a Pine, the stem of Lycopodium, the rhizome of Aspidium, and the stem of the Pumpkin. (8) Define the terms centric, bifacial, and iso-bilateral as applied to leaves.

N—Root and Rhizome Drugs. (9) Write the *official name*, the *common name*, the *natural order*, *botanical name*, the *name of the country* from *which derived*, the *most important chemical constituent*, and the *most important medicinal property* of each of four official root-drugs. (10) Write the official names of two root-drugs which contain milk-tissue. (11) Name two official root-drugs that owe their activity to poisonous alkaloids, giving also the name of the alkaloid in each case. (12) Name two root drugs and one rhizome-drug, all of which are official and all characterized by an intensely bitter taste.

O—Root and Rhizome Drugs. (13) State the sources of each of the following principles, giving the official name of the drug in each case: *Leontin*, *Chelerythrine*, *Sylvacrol*, *Atropine*, *Chrysophan*, *Emetine*, *Pelosine*, *Filicic Acid*, *Jervine*, and *Aristolochine*. (14) Name four official drugs belonging to the groups of Roots and Rhizomes that are powerful narcotic poisons. (15) Describe the structure of Belladonna Root. (16) Write the official names of each of the following drugs: Pinkroot, Blue Cohosh, Mayapple, Cranesbill and Marshmallow.

P—Barks, Woods, etc. (17) Name three official barks, each of which possesses three layers, and three others, each of which consists of the inner layer only. (18) What official bark is very tough and flexible, has silky bast-fibers, is very sternutatory when powdered, is acrid to the taste, and is capable of producing a blister when moistened and applied to the skin? (19) Name two official barks which have short and rigid bast-fibers, two which possess long and flexible ones, and two that possess none. (20) Name an official bark that is *febrifuge*, one that is *pectoral*, one that is *taenifuge*, one that is *cathartic*, and one that is *demulcent*.

SPECIMENS FOR RECOGNITION.

(1) Acidum sulphurosum. (2) Plumbi oxidum. (3) Sodii hyposulphis. (4) Alumen. (5) Plumbi Acetas. (6) Belladonnæ radix. (7) Podophyllum. (8) Aspidosperma (Quebracho). (9) Eriodictyon (Yerba Santa). (10) Strophanthus. (11) Pulvis rhei compositus. (12) Aqua chloroformi. (13) Spiritus juniperi compositus. (14) Emulsum chloroformi. (15) Tinctura calumbæ.

SENIOR EXAMINATION.

THEORY AND PRACTICE OF PHARMACY.

Put down on your paper all the figures used in making your calculations.

A—How many fluid ounces are there in a kilogramme of each of the follow-

ing official liquids? (1) Water. (2) Hydrochloric acid. (3) Ether. (4) Syrup. (5) Diluted Alcohol.

B—Give the unabbreviated official name; ingredients in preparing; describe the appearance of—(1) Compound Infusion of Gentian. (2) Fluid Extract of Ginger. (3) Soap Liniment. (4) Compound Syrup of Rhubarb. (5) Spirit of Peppermint. (6) Emulsion of Chloroform. (7) Compound Extract of Colocynth. (8) Plummer's Pills.

C—Give the English name, ingredients, and brief outline of process of the following: (1) Calx Sulphurata. (2) Argenti Nitras Fusus. (3) Ferri et Strychninæ Citras. (4) Emplastrum Plumbi. (5) Pilulæ Ferri Carbonatis. (6) Unguentum Aquæ Rosæ. (7) Pulvis Purgans. (8) Spiritus Glonoini.

D—(1) What is Monsel's Solution? (2) How is it prepared? (3) What are its uses? (4) What antidote is prepared from it? (5) How is the antidote made? (6) How is the antidote administered?

E—(1) How is Chloroform prepared? (2) What is its specific gravity? (3) What are its uses? (4) What is the official test for purity? (5) How is it preserved? (6) Is its vapor inflammable? (7) Name three official preparations in which Chloroform is used.

F—(1) What is Copaiba? (2) What are its constituents? (3) What official preparation is made from Copaiba? (4) Give the process for this preparation. (5) How is this preparation administered? (6) What is the dose?

G—(1) What is Chocolate? (2) How is it made? (3) What is the official name of the fatty constituent? (4) What is the English name of this constituent? (5) How is this constituent prepared? (6) What are the pharmaceutical uses of this constituent? (7) What is its melting point?

H—(1) Describe the apparatus for making Compressed Pills. (2) What are the advantages of Compressed Pills? (3) What are the disadvantages? (4) How are Tablet Triturates made? (5) How are Tablet Saturates made?

I—Criticise the following prescriptions. Write out the English name of each ingredient; state how you would compound each, and if any incompatibility would be developed in either; state what it is, and what would be the proper procedure.

℞ Chloral Hyd . . . . . gr. xl
Camph. Pulv. . . . . gr. x
Syr. Zingib . . . . . f ℥ij
Aquæ ad . . . . . f ℥ij
M. ft. Solutio.
S. A teaspoonful every three hours.

℞ Ferri et Quin. Cit. . . . . .
Ammon. Carb. . . . . aa ℥j
Sp. Ammon. Arom. . . . . ℥iv
Tinct. Opii . . . . . ℥ij
Aquæ ad . . . . . ℥viij
M. ft. S. One teaspoonful three times a day. A.

K—Criticise the following prescriptions. Write out the English names, with ingredients and quantities; state whether you would compound them as written, or what course you would pursue upon receiving them.

℞ Quinin. Sulph. . . . . gr. j
Ext. Nucis Vomicæ . . . . . gr. v
Morph. Sulph. . . . . gr. viij
M. ft. pil. No. x.
Sig. One pill every three hours.

℞ Potass. Permang. . . . . ℥j
Alcohol . . . . . ℥j
Glycerin . . . . . ℥ij
M. ft.
Sig. Use as directed. X.

CHEMISTRY.

A—(1) What are the native sources of Borax? Give the chemical formulas for *Sodii Boras* and for *Acidum Boricum*. (2) How would you prepare Borax from Boric Acid? (3) How would you prepare Boric Acid from Borax? (4) Give the most characteristic tests, both physical and chemical, for both these compounds.

B—(1) Describe the metal Sodium. (2) Give two of the methods used for its production. (3) Give the formulas of *Sodii Chloridum*, *Sodii Chloras*, *Sodii Hyposulphis*, *Sodii Phosphas*, and *Sodii Hypophosphis*. (4) What are the analytical tests for Sodium and its Salts?

C—(1) What are the chief ores of Zinc, and how is the metal obtained from them? Describe the metal, and enumerate its properties, both physical and chemical. (3) Mention the uses of Zinc, and state which alloys of it are of practical value. (4) Give the names and formulas of the official Salts of Zinc.

D—(1) Give the formula of *Acidum Chromicum*. (2) Give the formula of *Potassii Bichromas*, and of the normal Potassium Chromate, and explain the chemical difference between these formulas. (3) What takes place when an excess of Sulphuric Acid is added to a concentrated aqueous solution of Potassium Bichromate? (4) What takes place when an alkaline hydrate solution is added to a solution of *Potasii Bichromas?* (5) What pigments may be formed from Potassium Bichromate?

E—(1) Write the chemical formulas of—*Ferri Chloridum*, *Ferri Oxidum Hydratum*, *Ferri Sulphas*, *Ferri Hypophosphis*, *Potassii Ferrocyanidum*, *Ferri Lactas*. (2) State by what tests Ferrous Salts can be distinguished from Ferric Salts? (3) State how a Ferrous Compound can be converted into a Ferric one?

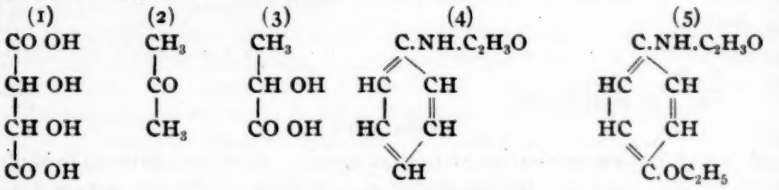
F—(1) Give the general formulas for the Paraffin, the Olefine, and the Benzene series of Hydrocarbons. (2) State the occurrence in nature or conditions of artificial formation of each of these series. (3) How could you distinguish, by chemical tests, between these three series?

G—(1) Name an official compound belonging to the class of Triatomic Alcohols. (2) State the source of the compound and how it is prepared from the naturally occurring products. (3) Write the reaction for its production from one of these substances. (4) Name the other products of the reaction just referred to.

H—(1) Write the graphic formulas of *Alcohol*, *Chloral*, *Acidum Carbolicum*, *Acidum Benzoicum*, and *Acidum Gallicum*.

I—(1) What is Phenol? (2) Name such official compounds as belong to the class of Phenols, and write their graphic formulas. (3) What is a Phenol-Acid? (4) Name such official compounds as belong to the class of Phenol-Acids, and write their graphic formulas.

K—(1) Name the compounds indicated by graphic formulas, and where official give both chemical and official names.



MATERIA MEDICA.

(1) Name and describe the different forms of Proteid that may exist in a cell.

(2) State how a wall of a cell may vary in composition.

(3) What are the distinctive characteristics of Meristem Tissue?

(4) Describe the characteristics of Epidermal Tissue and name its varieties.

(5) Under what circumstances is the Epidermis not cutinized?

(6) Describe the structure and state the use of a Stoma. How are Stomata distributed on the plant?

(7) Describe the usual form or shape of Chloroplast and their mode of increase.

(8) What relation does Chlorophyll bear to Chlorophyll-Bodies, and of what use to the plant is Chlorophyll?

(9) What are Conjoint Fibro-Vascular Bundles?

(10) What kind of bundles are characteristic of the following stems: The Fern, the Lycopodium, the Equisetum, the Monocotyl, and the Dicotyl?

(11) Write such a description of Aconitum as would serve for its certain identification.

(12) Name one of the most important structural characteristics of each of the following drugs: Taraxacum, Senega, Rheum, Cimicifuga, and Cinchona Calisaya.

(13) How, without aid from the senses of taste and smell, may Serpentaria be distinguished from Spigelia?

(14) By what chemical test may Guaiac Wood be readily recognized?

(15) By what simple test may chips of Red Saunders be readily distinguished from those of Logwood?

(16) By what simple means may Granatum be easily distinguished from other drugs?

(17) Name three official barks which are destitute of bast-fibers.

(18) Name three official barks that consist of the inner layer only.

(19) In the botanical classification of fruits, to what group do each of the following belong: Colocynth, Prunum, Fœniculum, Piper Nigrum, and Cardamomum?

(20) Name three official seeds that are albuminous and three that are exalbuminous.

(21) Write the botanical name and natural order of Crocus, and state what part of the plant is official.

(22) Name an acid and three important alkaloids found in Opium. Name an acid and three important alkaloids found in Cinchona.

(23) Write the botanical name and natural order of the plants from which each of the following drugs is derived: Elaterium, Manna, Opium, Guarana, and Zea,

(24) Name the source of each of the following alkaloids: Thebaine, Emetine. Pelosine, Chelerythrine, Cornutine, Menispine, and Hygrine.

(25) Name the source of each of the following non-alkaloidal principles: Meconic Acid, Rottlerin, Chrysophan, Cathartic Acid, Saponin, Elaterin, and Rhamnoxanthin.

(26) Name five official drugs that are powerful hydragogue cathartics.

(27) Name three powerful drugs that act as tonics to the heart, strengthening its beat; and three that powerfully depress the heart's action.

(28) Define the terms Cholagogue, Antiseptic, Antiperiodic, Mydriatic, and Anthelmintic.

(29) What are the most marked symptoms of opium poisoning, and what treatment is indicated?

(30) Name two powerful official drugs which, in medicinal doses, stimulate the respiratory function.

COMMITTEE.

A—(1) A solid body weighs 50 ounces in the air and 30 ounces in water. What is its specific gravity? (2) What is the volume of the body? (3) What is the weight of an equal volume of water? (4) What would it weigh if it were immersed in official Glycerin? (5) If two avoirdupois pounds of official Sulphuric Acid were poured into a measure graduated to show fluid ounces, to what number would it be filled?

B—*Asafœtida*. (1) Give botanical name, natural order, and habitat of the plant which yields Asafœtida. (2) Describe the characteristics of the natural order to which the plant belongs. (3) What appearance does the drug present in commerce? (4) Why does it form an emulsion when mixed with water? (5) What are its chief constituents, and to what is its odor due? (6) Name three official preparations of Asafœtida. (7) Give the dose of Asafœtida.

C—*Materia Medica*.—Belladonna Root. (1) Enumerate the characters by means of which Belladonna Root may be distinguished from any other official root. (2) What is the important alkaloid of Belladonna? (3) What is the most characteristic constitutional effect of Belladonna or of its alkaloid? (4) What is the dose of Belladonna Root? (5) Name the official drugs which in physiological action are closely related to Belladonna. (6) Why is the official name *Belladonna Radix* and not *Belladonna*?

D—(1) Name five official Fixed Oils, giving the Latin and English titles. (2) Describe briefly the processes for making the fixed oils of commerce used medicinally. (3) Name five official volatile oils, giving both Latin and English titles. (4) Describe briefly three processes by which volatile oils are procured.

E—(1) Give Symbol, Equivalence and Atomic Weight of the metal Magnesium. (2) What two kinds of Magnesium Oxide are official, and how is each made? What is the essential difference in chemical reaction with water between the two? (3) Which variety of Magnesium Carbonate is the official? (4) Give the chemical reactions that take place in making Liquor Magnesii Citratis.

F—(1) Give the antidotes for the following poisons: Arsenic, Corrosive Sublimate, Oxalic Acid. (2) What antidote would you administer for a corrosive liquid of unknown identity? (3) For what class of poisons are antidotes usually unavailing? In such cases how may the patient's life be saved?

G—Strophanthus. (1) Give its official name; botanical name. (2) To what region is it indigenous? (3) What is the active principle of Strophanthus? (4) What is the dose of Strophanthus? (5) What preparation of Strophanthus is official? (6) Give the dose of this preparation. (7) What are the medical properties of Strophanthus?

H—The molecular weight of *Crystallized Alum* is 946.46, and that of *absolutely dry Sodium Carbonate* is 105.85. How much of the Sodium Carbonate would be required for one kilogramme of Alum in the manufacture of *Aluminum Hydrate?*

I—Complete prescription No. 1 by inserting the quantities of the several ingredients, the patient being an adult and suffering from a mild dropsical condition.

Write out, in an unabbreviated form, what you would dispense in prescription No. 2.

1.

℞ Potass. Acetat. . . . . .
Infus. Digitalis . . . . . .
Ext. Tritici Fluid . . . . . .
Spt. Æther Nit . . . . . .
Infus. Buchu . . . . . .
M. Sig. Take a tablespoonful three times a day for four days.

2.

℞ Pot. Chlor. . . . . ℥j
Aq. Chlor. . . . . f℥iv
Spt. Syr. Nig. . . . . f℥ij
Syr. Zingib. . . . . q. s. ad ℥viij
M. Sig. Tablespoonful every two hours until relieved.

K—(1) Write a metric prescription for 100 pills, each to contain one-eighth grain Morphine Sulphate, one-sixtieth grain Strychnine Sulphate, and one twelfth grain Arsenous Acid, with the quantity of a suitable excipient, expressed metrically, to make one-grain pills.

(2) Translate the following prescription, giving the equivalents in apothecary's system:

GERMAN PRESCRIPTION.

℞ Chloroform . . . . . 50.
Ætheris . . . . . 60.
Ol. Sesami . . . . . 130.
M. ft. Liniment.
S. Use externally.

SPECIMENS.

The following specimens were placed before the senior students for recognition during the several examinations:

Pharmacy.

Aqua creosoti,
Spiritus ætheris nitrosi,
Spiritus ætheris compositus,
Ceratum plumbi subacetatis,
Pulvis ipecacuanhæ et opii,
Extractum sennæ fluidum,
Tinctura benzoini composita,
Syrupus ferri iodidi,
Extractum cinchonae fluidum,
Tinctura calumbæ.

Chemistry.

Aqua destillata,
Amylum,
Sodii salicylas,
Naphtalinum,
Sodii bicarbonas,
Sodii acetas,
Saccharum lactis,
Mangani dioxidum,
Potassii nitras,
Benzinum.

Materia Medica.

Bryonia,
Stillingia,
Geranium,
Calamus,
Euonymus,
Salvia,
Chenopodium,
Conium,
Physostigma,
Colchici semen.

Committee.

Tinctura cardamomi composita,
Linimentum chloroformi,
Extractum ergotæ fluidum,
Extractum gentianae fluidum,
Potassii bicarbonas,
Zinci acetas,
Ammonii chloridum,
Senega,
Guaiaci lignum,
Cascarilla.

OPERATIVE PHARMACY.

(*1*) *Ointment of Mercuric Nitrate.*

Mercury	2·5 gm.
Nitric Acid	2· c.c.
Nitric Acid	3· c.c.
Lard Oil	30· c·c.

Make Ointment of Mercuric Nitrate by the official process.

(*2*) *Pills.*

Ferric Citrate	3. gm.
Cinchonine Sulph.	1. gm.
Oil of Caraway	15 Drops.

Mix; make 15 pills.

Write in English, upon the label, all the ingredients and quantities used in making the pills, and put the label on the bottom of the box.

(*3*) *Suppositories.*

Ext. Belladonna Leaves	·50 gm.
Tannic Acid	·50 gm.
Oil of Theobroma	6·00 gm.

Make 6 suppositories, by rolling.

(*4*) *Prescription.*

Put up a prescription, *secundum artem*, each teaspoonful dose of which shall contain five minims each of Tincture of Guaiac and Spirit of Nitrous Ether, with sufficient water to make two fluid ounces. Write upon a separate label the contents of the bottle, and attach it.

(5) *Plaster.*

Spread a breast-plaster, about 6 inches in diameter. Soap plaster will be found in the dipper.

ANALYTICAL CHEMISTRY.

(*Students of the second-year class were also given this examination.*)

The examination in this branch consisted in the examination of a compound powder for metals and inorganic and organic acids.

VEGETABLE HISTOLOGY.

(*Students of the second-year class were also given this examination.*)

(1) To which of the following plant types does the specimen belong: The Fern, the Monocotyl, the Gymnosperm, or the Dicotyl? (2) Which of the following organs does it represent: a root, the petiole of a leaf, or a stem? Give the reason for your conclusion. (3) Make a diagram of the cross-section and locate such of the following parts as are represented: the epidermis, the periderm, the pith, the cambium zone, a medullary ray, the xylem of a bundle, the endodermis and the pericycle. (4) Enumerate the tissues which you find present. (5) Is starch present? What test did you employ to determine? In what parts of the section is it most abundant? (6) What tissues are lignified? In what part of the section were the lignified tissues most abundant? Describe your method of testing for lignified structures. (7) What varieties of secretion tissue do you find, and how are they distributed? (8) If milk tissue is present, state which variety it represents and how it is distributed. (9) For clearing sections of starch and proteid matters, what reagents may be employed? (10) Suppose you find crystals in a cell, by what means could you tell whether they are protein crystals or mineral crystals? Having determined that the crystals are inorganic, how could you tell whether they are composed of calcium carbonate or of calcium oxalate?

SEVENTY-SIXTH ANNUAL COMMENCEMENT.

The exercises connected with conferring the degree of Graduate in Pharmacy were held at the College Building, Wednesday evening, April 14, at 8 o'clock.

Prayer was offered by Rev. B. L. Agnew, D.D.

President Bullock conferred the degree upon the following:

Name.	*Subject of Thesis.*	*State.*
Althouse, Harry B.,	*Pharmacy journals,*	Pennsylvania.
Anderson, Ralph Samuel Lloyd,	*Progress in pharmacy,*	Pennsylvania.
Baker, Newton Claire,	*Arsenic and its preparations,*	Pennsylvania.
Bartholomew, Claude Lafayette,	*Antipyrine,*	Pennsylvania.
Bates, John Phillips,	*Liquor potassæ et liquor sodæ,*	Pennsylvania.
Breithaupt, Alphons Peter,	*Structure of leptandra,*	Pennsylvania.
Brumbaugh, Albert Sylvester,	*Digestive value of Carica papaya,*	Ohio.
Clapp, Samuel Clarence,	*Kola nut,*	Pennsylvania.
Clark, Edward B.,	*Glycerinum,*	Pennsylvania.
Cloud, Norman Henderson,	*Copaiba,*	Pennsylvania.
Codori, Simon Jacob, Jr.,	*Cinchona bark,*	Pennsylvania.
Compton, Richard Hal,	*Valuation of liquor iodi compositus,*	Texas.
Cooper, Morris,	*Testing in retail pharmacies,*	Pennsylvania.

Name.	Subject of Thesis.	State.
Cope, Edward Kreidler,	*Opium and its uses*,	Pennsylvania.
Criswell, Edward Ott,	*Cascara sagrada*,	Pennsylvania.
Deibert, William Henry,	*Tasteless Cascara sagrada compounds*,	Pennsylvania.
Eschbach, Clarence Derbie,	*Syrupus acidi hydriodici*,	Pennsylvania.
Farley, Levi James,	*Vegetable histology*,	Pennsylvania.
Few, Colin Spangler,	*Olive oil*,	Pennsylvania.
Garrison, Joseph Miller, Jr.,	*Value of pharmacognosy*,	New Jersey.
Gessford, Otice Eugene,	*The pharmacists*,	Pennsylvania.
Godfrey, Swain Townsend,	*Coal*,	New Jersey.
Godshall, Samuel R.,	*Acidum aceticum dilutum*,	Pennsylvania.
Goodfellow, Charles Rumney,	*Pharmacists and their imitators*,	Pennsylvania.
Gross, Paul Herbert,	*Olive oil and its production*,	Pennsylvania.
Harry, Hamilton Maxwell,	*Camphor*,	Pennsylvania.
Heim, Christian,	*Liquor plumbi subacetatis*,	Pennsylvania.
Hildebrand, Howard Ovid,	*Coca*,	Pennsylvania.
Hörst, Harry Lewis,	*The pharmacy of brewing*,	Pennsylvania.
Howell, Harry Field,	*Cocaine*,	Pennsylvania.
Hukill, Oscar K.,	*Pharmaceutical education*,	Arkansas.
Ingling, Howard Edgar,	*Cinchona*,	New Jersey.
Jefferis, David Strode,	*Opium*,	Pennsylvania.
Jennings, Isaac Astor,	*The relation of the druggist to the physician.*	Virginia.
Johns, Frank James,	*Koumys*,	Pennsylvania.
Kessler, Lawrence Anthony,	*Assay of spiritus ætheris nitrosi*,	Ohio.
Kirlin, Charles Coleman Hagenbuch,	*Attar or otto of rose*,	Pennsylvania.
Kramer, George Henry,	*Syrupus ferri iodidi*,	Pennsylvania.
Laughlin, Albert Russell,	*Gossypium herbaceum*,	Pennsylvania.
Lenhart, Enos Samuel,	*Sulphuric acid*,	Pennsylvania.
Levan, Walter,	*Ergot*,	Pennsylvania.
Lewis, Daniel William,	*Opium*,	Pennsylvania.
Liebert, Charles Frederick,	*Concentrated infusions*,	Pennsylvania.
Longshaw, Thomas Elmer,	*Poisons and their antidotes*,	Pennsylvania.
Luhr, Frederick A.,	*Cascara sagrada*,	Pennsylvania.
Lukens, Charles Baker,	*Hydrogen dioxide*,	Pennsylvania.
McGehee, Hanford Bell,	*Ointments*,	Virginia.
McNeil, Thomas Hunter,	*Kola*,	Pennsylvania.
Matusow, Harry,	*Kalmia latifolia*,	Russia.
Metzler, Claude Dallas,	*Belladonna*,	Pennsylvania.
Morgan, Clayton Edward,	*Adulteration*,	Massachusetts.
Mueller, Charles August,	*Abstracts*,	Pennsylvania.
Nebel, Charles William,	*Ointments and cerates*,	Pennsylvania.
Parry, Edward,	*Powdered extract of licorice*,	Wales.
Parry, William Hough,	*Medicated waters*,	Pennsylvania.
Pearce, Samuel Robert,	*Camphor*,	New Jersey.
Peiffer, Charles Oscar,	*Acacia*,	Pennsylvania.
Praul, Walter Francis,	*Rheum*,	Pennsylvania.
Punt, Arnold Anthony Joseph,	*Density of solutions*,	Pennsylvania.
Reese, John Bull,	*Cinchona*,	Pennsylvania.
Rieben, Ernest,	*Stramonium*,	Pennsylvania.

Name.	*Subject of Thesis.*	*State.*
Roth, Frans Johan	*Arsenic and its compounds,*	Sweden.
Seipel, Harry Bertram,	*Zingiber,*	Pennsylvania.
Smiley, Laura Marguerite,	*Podophyllum,*	Pennsylvania.
Stommel, Henry Aloysius,	*Liquorice in pharmacy,*	Pennsylvania.
Streeper, Austin,	*Cinchona barks,*	Pennsylvania.
Tobias, Isaac Herbert,	*Preservative for syrup of ferrous iodide,*	Ohio.
Troxell, John Isaac Peter,	*Ergot,*	Pennsylvania.
Weitzel, Sue C.,	*Veratrum viride,*	Pennsylvania.
Wentzler Hartman Gotthard,	*Percolation of every tincture of U.S.P.,*	Pennsylvania.
Wetzel, Samuel,	*Belladonna,*	Pennsylvania.
Wilson, Oliver Fawcett,	*Solid extracts by acetic acid,*	Pennsylvania.
Winger, John Bowman,	*Gelatin capsules,*	Pennsylvania.

STATES AND COUNTRIES REPRESENTED BY THE GRADUATING CLASS.

Arkansas	1	Pennsylvania	58	Virginia	2
Massachusetts	1	Russia	1	Wales,	1
New Jersey	4	Sweden	1		—
Ohio	3	Texas	1	Total,	73

Special certificates for a two years' course in general, applied and analytical chemistry were awarded to:

Bertha Leon DeGraffe, New York.,
Freeman Preston Stroup, Pennsylvania.
S. Allen Tucker, Pennsylvania.
Wm. Clements White, Pennsylvania.

The degree of Master in Pharmacy was conferred on the following:

Virgil Coblentz, New York.
John Uri Lloyd, Ohio.
Charles T. George, Pennsylvania.
Jacob H. Redsecker, Pennsylvania.
Lucius Elmer Sayre, Kansas.

The following members of the class attained the grade of Distinguished:

Albert Sylvester Brumbaugh.
Harry Matusow.
Clayton Edward Morgan.

AWARD OF PRIZES.

The Maisch Memorial Prize of a Zentmayer microscope, offered by the family of the late Professor Maisch, for original histological work on American plants, was awarded to Alphons Peter Breithaupt.

The William B. Webb Memorial Prize, consisting of a gold medal and certificate, for the highest general average in operative pharmacy, specimens and committee examinations, offered by Mrs. Rebecca T. Webb, was awarded to Albert Sylvester Brumbaugh.

The Chemical Prize of $25 in gold, offered by Prof. Samuel P. Sadtler, for original quantitative analysis, was given to Harry Matusow. The following

graduate received honorable mention in connection therewith: Lawrence Anthony Kessler.

The AMERICAN JOURNAL OF PHARMACY Prize of $25, offered by Prof. Henry Trimble, for a paper (not intended for a thesis) involving original work in the Chemical Laboratory, was awarded to Harry Matusow.

The John M. Maisch Prize of $20 in gold, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, was awarded to Claude Dallas Metzler, with honorable mention of John Phillips Bates and Albert Sylvester Brumbaugh.

The Operative Pharmacy Prize of $25 in gold, offered by Prof. Joseph P. Remington, for the best examination in operative pharmacy, was awarded to Clayton Edward Morgan, with honorable mention of the following graduates: Enos Samuel Lenhart, Alphons Peter Breithaupt, Oliver Fawcett Wilson, Richard Hal Compton and Albert Sylvester Brumbaugh.

The Robinson Chemical Prize of a gold medal and certificate, offered by Mr. James S. Robinson, of Memphis, Tenn., for the best examination in general and analytical chemistry, was awarded to Clayton Edward Morgan.

The valedictory address to the graduating class was delivered by Professor Joseph P. Remington.

The farewell supper of the professors to the graduating class was given in the Museum of the College, Tuesday evening, April 13th. The officers and trustees of the College were present, together with some other invited guests. Professor Remington, as Dean of the Faculty, was master of ceremonies, and after the *menu* was disposed of speeches were made by the President of the College, members of the faculty, some of the trustees, members of the class and invited guests.

ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHARMACY.

The Thirty-third Annual Meeting of the Alumni Association of the Philadelphia College of Pharmacy convened in the Auditorium of the College Building, 145 North Tenth Street, on Monday afternoon, April 12, 1897.

President Dr. J. Louis D. Morison, '88, presided, and called the meeting to order at 2.30 P.M., 22 members being present.

The President read his address, in which he said: "With the close of the exercises attending the reception to the seventy-sixth graduating class to-night, we shall have rounded out nearly a third of a century of existence as an active organization; and while the past year has not shown any very conspicuous evidences of activity beyond that of mere routine work, yet I am happy to say we are still quite healthy. Notwithstanding the fact that there has been observed at times slight symptoms of inertia of the interest in the work of the Association which, during the past year has, at times, seemed to flag, I am by no means convinced that she is, therefore, losing her vitality as an organization." He advised the infusion of more new blood into her veins by every member giving to the Association a more lively interest, and he did not share with some the opinion that because the Association has relinquished its interests in the Quizzes it has, therefore, no important work to do. On the contrary, he felt there never was a time in its history when its field for work was larger and more full of promise

than it is to-day, and the advent of the session of 1897–98 will see our College doors thrown open to receive for the first time in her history three distinct classes.

He recommended the publishing of the ALUMNI REPORT twelve times a year, and believed the question was already uppermost in the minds of very many of the active members, and urged the advisability of giving to this important matter early and earnest consideration.

He also advised the holding of the Alumni Social Meetings in the future in the evenings instead of the afternoons, as heretofore.

In closing, he expressed what he believed to be the sense of the meeting, and that was the profound sorrow felt by all at the death of Prof. Edson S. Bastin. "By his untimely departure we sustain the loss of an honored member and the College a valued and distinguished teacher; and while we lament the passing away of Edson S. Bastin, we, at the same time, rejoice that it was our great privilege to have had him in our midst, for, by his genius and indomitable energy, there has been added to our College a microscopical laboratory second to none in any teaching institution in the country—a work that will ever remain a glorious monument to his memory.

The Secretary, Wm. E. Krewson, '69, presented his seventeenth annual report as Secretary, in which he reviewed the work of the Association for the past year, but regretted that the Association had not been more active.

During the year sixty-five members have been added, seven who paid the required fee and fifty-eight who were members of the College Review Quiz Classes.

The membership now numbers 2,749, after deducting those who died during the year, making a net gain of thirty-nine new members for the year.

The report of the Memorial Committee showed that twenty-six of the active members had died during the year; also eleven of our graduates who were not active members.

The Secretary also reported that two of our honorary members had died, viz: First Vice-President Robert Shoemaker and Prof. Edson S. Bastin.

Twenty of the members had procured the Alumni badges during the year, making a total of 285 members who had procured the badge.

The Secretary suggested the dispensing of the Social Meetings altogether or the holding them in the evenings; also to petition the Committee on Property of the Board of Trustees to have the College Museum open every day for the use of the students and pharmacists who might wish to avail themselves of visiting it, and have a suitable person in charge to care for the room and its valuable collections.

He also suggested the publishing of the *Alumni Report* each month in the year.

The Treasurer, Wm. Lincoln Cliffe, '84, reported that he had received from all sources during the year $2,658.83, which, added to the balance in the treasury at the commencement of the year, made a total of $2,925.77. The disbursements amounted to $2,849.37, leaving a balance in the treasury of $76.40.

John Uri Lloyd, of Cincinnati, O.; Dr. Edward Robinson Squibb, of Brooklyn, N. Y., and Dr. Chas. Rice, of New York City, were unanimously elected as honorary members of the Alumni Association.

The following officers were elected for the ensuing year, viz :

President, Harry L. Stiles, '85; First Vice-President, James C. Perry, '91; Second Vice-President, F. Wm. E. Stedem, '82; Treasurer, Wm. Lincoln Cliffe, '84; Secretary, Wm. E. Krewson, '69; Corresponding Secretary, Theodore Campbell, '93. Board of Directors, for three years: Henry Trimble, '76; David H. Ross, '78; Wm. N. Stem, '73; Dr. J. Louis D. Morison, '88.

John H. Hahn, '81, was elected to fill the vacancy of two years caused by the election of Theodore Campbell, '93, as Corresponding Secretary. The present Recording Secretary, Wm. E. Krewson, was re-elected for the eighteenth time.

The Thirty-third Annual Reception to the seventy-sixth graduating class was held on the evening of the same day in the College Auditorium, and was one of the most successful ever held. The hall was beautifully decorated with the College colors and the American flag.

An interesting concert programme was rendered by Bastert's Parlor Orchestra. The President, Dr. J. Louis D. Morison, presided, and made a few introductory remarks and welcomed the new members.

The Secretary called the roll of those elected during the year.

The annual class oration was delivered by Howard Ovid Hildebrand of York, Pa.

The reciting of the poem dedicated to the seventy-sixth graduating class was rendered by Samuel R. Godshall, of Soudertown, Pa.

Samuel Clarence Clapp, Jr., of Milton, Pa., gave the history of the Class of 1897, and Harry Lewis Hörst, of Lock Haven, Pa., foretold the future of the Class of 1897.

The Alumni gold medal was presented to Clayton Edward Morgan, of Philadelphia, Pa., a son of our fellow member of the Alumni Association, Frank E. Morgan, of the Class of '81; and it was presented in a very pleasing manner by Dr. Clement B. Lowe, '84. The eight prize certificates for the highest general average in each of the branches were awarded to the following students, viz. :

CERTIFICATES.

Pharmacy—John Phillips Bates, Mansfield, Pa.

Chemistry—Walter Francis Praul, Philadelphia, Pa.

Materia Medica—Harry Matusow, Minsk, Russia.

General Pharmacy (Committee)—Samuel Robert Pearce, Manasquan, N. J.

Operative Pharmacy—Oliver Fawcett Wilson, Pittsburg, Pa.

Analytical Chemistry—Albert Sylvester Brumbaugh, Mansfield, O.

Pharmacognosy (Specimens)—Claude Dallas Metzler, Harrisonville, Pa.

Microscopy (Vegetable Histology)—Miss Laura Marguerite Smiley, Philadelphia, Pa.

The Testimonial Prize certificates to the undergraduates receiving the highest general averages in the first- and second-year class examinations were awarded to Melvin William Bamford, of the first-year class, of Reading, Pa., and to George Carll Keen, of Vinelaud, N. J., of the second-year class.

The last named certificate was awarded for the first time this year, it being the first examination for second course students under the new curriculum.

W. E. K.

MINUTES OF THE ANNUAL MEETING OF THE COLLEGE.

The annual meeting of the members of the College was held March 29, 1897. Wm. J. Jenks, Second Vice-President, presided. The minutes of the meetings of the Board of Trustees for January, February and March were read and adopted.

The next in order was the presentation of the annual reports of officers and permanent committees.

The following was submitted by the Editor of the AMERICAN JOURNAL OF PHARMACY:

This report covers the issues from April 1, 1896, to March 1, 1897, inclusive. During that time there have been published 708 pages of reading matter, an increase over that reported last year of 66 pages; the average for each of the twelve numbers being 59 pages against an average of 53½ pages last year. This is the greatest number of pages ever issued by the JOURNAL in one year.

The number of original papers published during the year was 83, an increase of nine over last year; these occupied 397 pages, against 374, 297 and 159 in each of the immediately preceding years. These papers were prepared expressly for the JOURNAL, and the number given does not include those read before other societies, abstracts, translations or editorials.

The number of authors contributing were 51, of whom 16 were members of the College and 35 were non-members.

Illustrations were published in every number of the JOURNAL, and amounted to a total of 89 during the year, making an average of 7·4 for each issue, against a total of 76 last year, averaging 6·3 for each issue.

No difficulty has been experienced during the year in securing original matter for publication; in fact the more serious question has been, how to utilize all that is offered without considerably enlarging the size of the JOURNAL. The latter alternative may be better considered in connection with the Report of the Committee on Publication.

The Publication Committee reported the regular issue of the JOURNAL during the year. There was a gain in the number of new subscribers, and the character of these was such as to give decided encouragement to the committee. The financial part of the report was likewise gratifying in character.

The following was presented by the Librarian:

PHILADELPHIA, March 29, 1897.

The Librarian respectfully reports that, during the past year, there have been added to the library 440 volumes, besides the various periodicals which are received in exchange for the AMERICAN JOURNAL OF PHARMACY. There has been expended $430.71 for books, and for binding, $68.90.

The library has been consulted by very many of our students, and by several parties who were referred to our books for information not to be found elsewhere.

T. S. WIEGAND, *Librarian.*

The Curator submitted the following:

PHILADELPHIA, March 29, 1897.

Philadelphia College of Pharmacy.

GENTLEMEN:—Your Curator would respectfully report that the Museum is in a good condition and has received a number of valuable accessions during

the year. Among those who contributed were Prof. J. W. Toumey, of the University of Arizona; Mr. J. H. Maiden, of Sydney, New South Wales; Prof. Alfonso Herrera, of Mexico; Mr. J. Bosisto, of Melbourne, Australia, and Mr. E. M. Holmes, of the Pharmaceutical Society of Great Britain.

The need exists for more shelf room in the Museum, and this will be imperatively required, if a certain promised collection of drug products—which is extensive and valuable—is secured.

There is another matter that should be referred to. While the College is rich in its splendid herbarium, in its collection of plants and plant-products, in its collection of chemical and pharmaceutical products, it lacks one thing, and that is a collection of minerals representing the origin of the elements and of the inorganic chemical compounds—not a geological collection, but a collection of raw material—so to speak—that will exhibit to the pharmaceutical student the primary source of his elements and inorganic chemical compounds. Such a collection need not be very expensive, and would add much to the value of the Museum. Your Curator would therefore respectfully suggest that, as soon as the condition of the treasury will permit, that such a collection be bought. I am,

Yours respectfully,

J. W. ENGLAND, *Curator.*

The various reports having been presented and accepted, the next matter of business was the annual election of officers. The death of Mr. Robert Shoemaker having left void the office of First Vice-President, the order of succession was accorded to Mr. William J. Jenks, Second Vice-President, and he was thereupon elected to the position made vacant by Mr. Shoemaker's death. Mr. Howard B. French having been elected to succeed Mr. Jenks as Second Vice-President, the total number of officers elected was as follows:

President, Charles Bullock; First Vice-President, William J. Jenks; Second Vice-President, Howard B. French; Treasurer, James T. Shinn; Corresponding Secretary, Dr. A. W. Miller; Recording Secretary, William B. Thompson; Librarian, Thos. S. Wiegand; Curator, Jos. W. England; Editor, Prof. Henry Trimble; Publication Committee, Henry N. Rittenhouse, et. al., Editor H. Trimble, *ex-officio;* Trustees for Three Years, Wallace Procter, Gustavus Pile, W. Nelson Stem; Trustees for Unexpired Terms, F. W. E. Stedem, Richard M. Shoemaker.

As the annual meeting of the American Medical Association will be held in Philadelphia in June, Professor Remington moved that an invitation be extended to the Association to hold the sessions of the section on Materia Medica at this College, and it was so ordered.

On motion, the meeting adjourned.

WILLIAM B. THOMPSON, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, April 20, 1897.

The regular Pharmaceutical Meeting of the present series was held in the Museum of the College at 3.30 P.M. Dr. C. B. Lowe presided. The minutes of the previous meeting were allowed to stand as published.

The first paper presented was on "Observations on Some Recent Suggestions Concerning Ointment of Mercuric Nitrate," by Charles H. LaWall. This paper furnished the occasion for an interesting discussion, during which several important practical points were brought out.

In reference to the permanence of Citrine ointment, Mr. F. W. E. Stedem said that he had kept it for more than six months without any apparent change having taken place. He also remarked that by thorough oxidation of the oil previous to the addition of the mercuric nitrate solution, granulation, which so often occurs, was prevented.

Mr. LaWall believed that the variability in quality of this ointment was largely due to difference in manipulation. He also spoke in reference to its keeping quality, and said that this property was enhanced by heating the mixture after addition of the mercuric nitrate solution, until effervescence ceased.

The next paper, which was on a comparative analysis of the root, rhizome and stem of "Gelsemium," by L. E. Sayre, was read by T. S. Wiegand. The results showed that the constituents upon which the therapeutic value of the drug depends were not present in the stem, and the author, therefore, concluded that an admixture of this part of the plant must reduce the value of the drug.

With reference to the use of gelsemium as a remedial agent, Mr. W. L. Cliffe said that other drugs possessing similar properties appeared to be more frequently prescribed.

Dr. Lowe considered it valuable in cases of facial neuralgia, but did not favor its use where aconite was indicated.

An interesting contribution on "The Presence of Starch and Strontium Sulphate in Opium and their Influence on Assaying," prepared by Lyman F. Kebler and Charles H. LaWall, was read by the former.

The authors stated that starch had been found in opium in a number of instances, they themselves having found wheat starch in opium assayed during the past two years. The amount found by them varied from a trace to 8 per cent. But as this substance does not influence the results in assaying they questioned whether or not it could be regarded as an adulterant in the true sense of the word, since the only requirement for opium is that it shall contain a certain amount of morphine.

A matter for more serious consideration was the presence of strontium sulphate in opium, which substance, even in the most carefully conducted assays, according to the U.S.P. method, was found to increase the percentage of crude morphine.

For correcting the results the authors recommeded the ash method as probably being the best, considering the present impurities in opium.

In addition to the consideration of the papers, a number of subjects possessing particular interest for the retail pharmacist were presented for discussion, and altogether the meeting was one of the most profitable of the present series.

On motion, the meeting adjourned.

THOS. S. WIEGAND,
Registrar.